

# H-3 SEA KING in action



**SPECIAL**  
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Aircraft Number 150  
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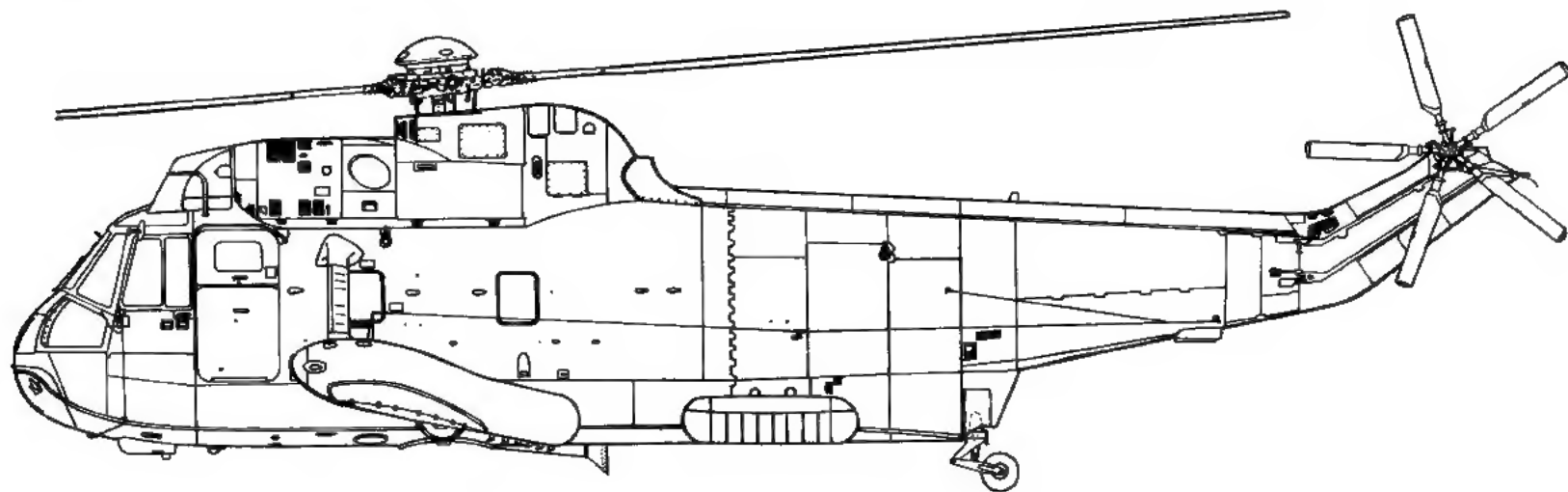
# **H-3 Sea King**

**By Al Adcock**

**in action**

**Color By Don Greer & Tom Tullis**

**Illustrated by Joe Sewell, Tom Tullis, Don Greer  
& Robert Harrison**



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SEALs deploy from a SH-3 Sea King of HS-9 Sea Griffins to plant explosive charges on a floating mine in the Persian Gulf during Operation DESERT STORM. Once safely back on the Sea King and clear of the area, the mine will be detonated.

## Acknowledgements

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Mike Slover	U.S. Navy
Nick Young	LT Lavandera
U. S. Coast Guard	Wayne Mutza
Canadian Forces	CAPT. G A. Penner
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U.S. Navy Office of Information	Rod Nelson
CDR Paul Novak, USN	Canadian Coast Guard
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**A SH-3H Sea King of Helicopter Anti-submarine Squadron Eleven (HS-11) Dragonslayers, lifts off the deck of USS AMERICA (CV-66) in the Persian Gulf during Operation DESERT STORM. (USN via Ron Williamson)**





# Introduction

With its development in the 1940s, the helicopter has taken on many roles previously reserved exclusively for fixed wing aircraft and no other name has been more closely associated with the term helicopter than Sikorsky.

In 1919, Igor I. Sikorsky immigrated to the United States following the Russian revolution and by 1923 he had founded the Sikorsky Aero Engineering Corporation on Long Island, New York so he could build the S-29A all metal flying boat. Prior to coming to the United States Sikorsky had worked on helicopter as well as fixed wing designs in his native Russia. Sikorsky fielded many successful designs during the Great War, the First World War, notably the S-16, a two seat reconnaissance aircraft and the S-20, a single seat scout, both were biplanes and were powered by a Gnome rotary engine.

The Sikorsky S-29A, the A standing for America, was the first of many successful flying boat designs. Sikorsky went on to build the S-36, an eight seat amphibian and the S-40, a four engined amphibian that entered service during 1931 with Pan American World Airlines. Sikorsky also built some of the world's largest flying boats during the 1930's, the S-42 and S-43, both of which were flown by Pan American World Airways in regular commercial passenger service on the Atlantic and Pacific routes.

In 1929, the Sikorsky Aviation Company, as it was now called, moved to Stratford, Connecticut, where it would soon merge with the United Aircraft and Transport Company. When United Aircraft purchased the Vought Airplane Company, it was merged with Sikorsky to become the Vought-Sikorsky Airplane Company.

**Igor Sikorsky pilots the Vought-Sikorsky VS-300, the first successful helicopter design. This was Sikorsky's third design, the first two were tested in his native Russia. (Sikorsky via Ken Short)**

In 1931, Sikorsky applied to the U.S. Patent Office for a patent on a helicopter design and in 1935 it was granted. Work progressed very slowly on a flying prototype due to severe budget restrictions imposed by the parent company, United Aircraft, brought on by the great depression. In 1939, the VS-300 was rolled out of the experimental design shop. The VS-300 went through one year of testing, tethered and un-tethered flights and underwent many design changes to improve flight performance. The tail rotor went through many changes to improve directional stability. On 13 May 1940, the first truly successful flight was made that employed all of the flight characteristics of a true helicopter. Igor Sikorsky made most of the test flights himself, wearing his characteristic bowler hat.

The success of the VS-300 led to the development of the Sikorsky VS-316A, the first single rotor helicopter designed for the U.S. Army Air Corps. The VS-316A was soon designated as the XR-4 and over 130 were produced for the U.S. Army, Navy and Coast Guard. The U.S. Armed Forces early on discovered the versatility of the R-4 and the R-4 design grew into the R-5, called the H-5 by the U.S. Army and the HO2S-1 Dragonfly by the U.S. Navy. This helicopter soon became the benchmark for future helicopter development and use.

A succession of helicopter designs rolled off the production line at the Sikorsky Stratford plant, the H-19, designated as HO4S in U.S. Navy service, and H-34 designated as HSS-1 by the U.S. Navy. The U.S. Army used the both H-19 and H-34 for cargo and troop movement, while the U.S. Navy used them for Search and Rescue (SAR) and Anti-submarine warfare (ASW). When it became clear the piston engine could not produce the horsepower for size and weight that the turbine engine offered, the U.S. Navy put out a Request For Proposals (RFP) for a helicopter that would replace the HSS-1 Seabat and employ the new turbine engine.

**The U.S. Navy used the HSS-1N (H-34J) Seabat in Hunter-Killer pairs in the anti-submarine role during the late 1950s. HS-4 Black Knights (tail code TA) operated in the Pacific with HSS-1Ns until they were replaced by HSS-2 Sea Kings in 1963. (Navy via Jim Presley)**





The HSS-1 Seabat was used by the U.S. Navy as hunter/killer pairs in the anti-submarine warfare (ASW) role during the 1950s. The Navy wanted to combine the two roles into one airframe and also to employ a turboshaft gas turbine engine for greater range and performance. On 24 December 1957, the Navy contracted with Sikorsky for the development of a helicopter that could not only locate an enemy submarine, but once located, destroy it.

Sikorsky's answer to the U.S. Navy's request was their S-61 design that employed a watertight boat hull, turbine engines and a five bladed main and tail rotor system. The original contract called for a single prototype and six pre-production aircraft, but this later grew to ten. The XHSS-2 prototype (BuNo 147137) made its first flight on 11 March 1959 from the Sikorsky plant at Stratford, Connecticut. The XHSS-2 was a large, for its time, helicopter with a fuselage length of fifty-four feet nine inches and an overall height of sixteen feet ten inches. The XHSS-2 was powered by a pair of General Electric 1,050 SHP T-58-GE-6 turboshaft engines that drove a sixty-two foot diameter, five bladed main rotor through a free wheeling transmission. The XHSS-2 featured strut mounted sponsons on each side that served two functions, floatation and fairings for the retractable main landing gear. The sponsons also contained inflatable emergency floatation bags for further stabilization in water operations. For all weather operations, the prototype was fitted with Doppler radar, a feature that was carried over to all production aircraft. The aircraft was also fitted with a radar altimeter and a Hamilton Standard auto stabilization system that provided for automatic transition, hands off, to a hover. The XHSS-2 had a empty weight of 9,763 pounds and a maximum gross weight of 26,500 pounds. In a clean configuration it had a top speed of 166 mph and a normal cruise speed of 133 mph. Total fuel capacity was 642 gallons, carried in two bladder tanks. This gave the XHSS-2 a range of 540 miles. The service ceiling was 14,700 feet and the XHSS-2 could hover out of ground effect at 8,500 feet.

The Sikorsky S-61/XHSS-2 design bore a strong family resemblance to the Sikorsky S-62. The S-62 was a single engine, turbine powered aircraft that used the dynamic rotor components of the HSS-1/H-34. The S-62 flight test program provided valuable flight data for the S-61. The first flight of the XHSS-2 Sea King (BuNo 147137) took place on 11 March 1959 from the Sikorsky Stratford, Connecticut plant. The XHSS-2 was the first twin turbine engined helicopter accepted by the Navy. (Navy via Jim Presley)



61/HSS-2 program, since the S-62 had its first flight some nine months earlier than the S-61. The S-62 would later go on to serve with the U.S. Coast Guard as the HH-52A with some 95 examples being built. For rescue operations the XHSS-2 was fitted with a rescue hoist above the starboard fuselage cargo door. The XHSS-2 could land in the water to effect a rescue, utilizing its watertight boat hull, but the preferred method of rescue was to use the rescue hoist and the horse-collar sling. The rescue hoist contained a 300 foot length of wire cable and could hoist up to 600 pounds.

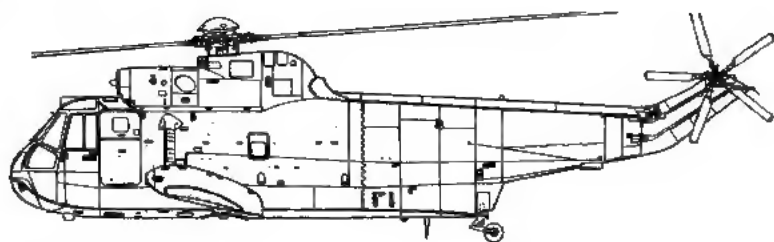
In February 1961, after two years of flight trials at Sikorsky, the XHSS-2 prototypes, now officially called Sea Kings were flown to NAS Patuxent River, Maryland to undergo the U.S. Navy Board of Inspection and Survey (BIS) trials. While undergoing BIS trials the Gloss Navy Blue XHSS-2s were redesignated as YHSS-2. The BIS trials were designed to test service acceptability and were flown by the Air Test and Evaluation personnel of the Rotary Wing Aircraft Test Directorate of the Naval Air Test Center.

**The XHSS-2 Sea King prototype demonstrates its capability to operate from water. The side sponsons gave the aircraft additional stability in the water and the boat type hull gave the Sea King excellent water maneuverability. The aircraft was overall Gloss Sea Blue with White lettering. (via Paul Novak)**

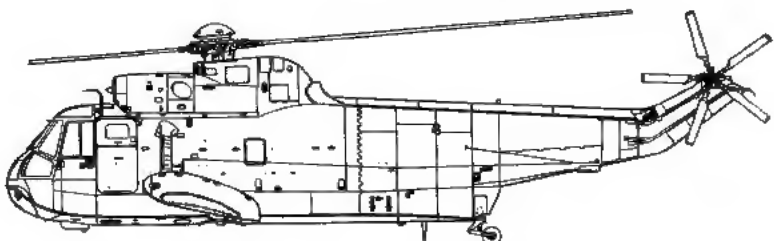


## Development

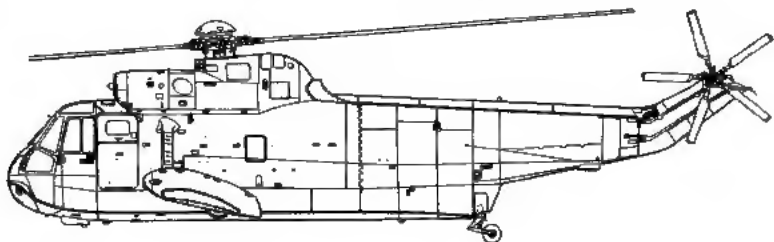
XHSS-2



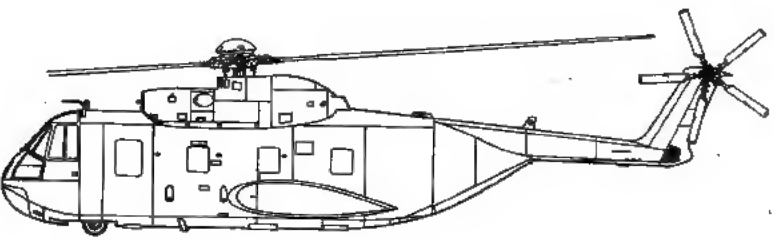
SH-3A



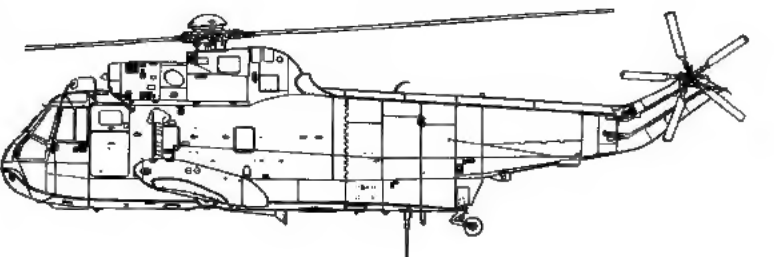
CH-3B



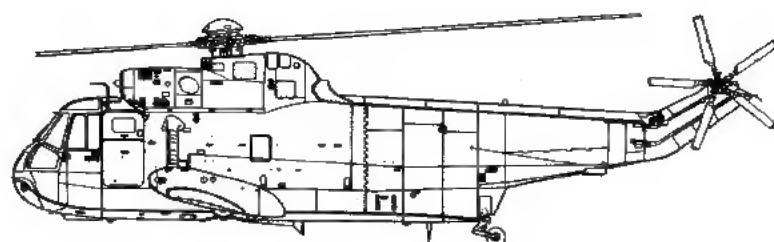
CH-3C



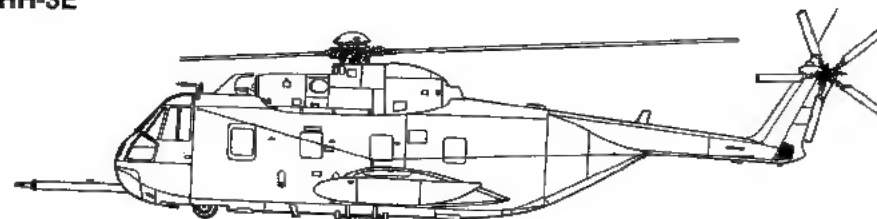
HSS-2B  
(Japan)



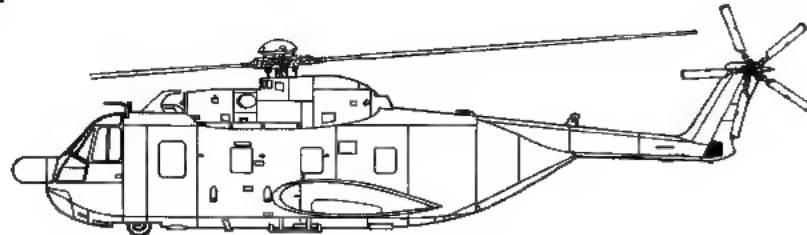
SH-3D



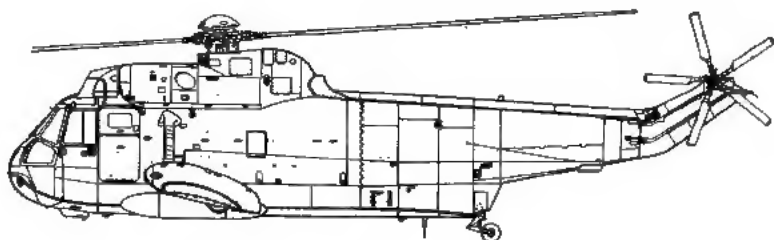
HH-3E



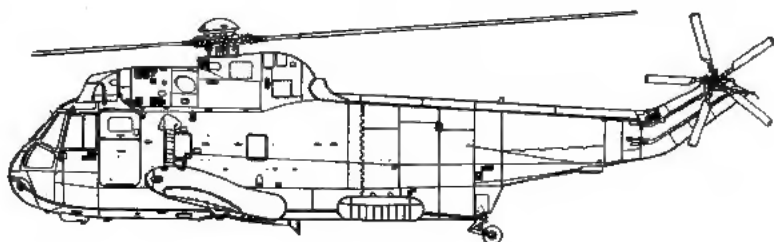
HH-3F



SH-3G



SH-3H





# HSS-2 (H-3A)

During the U.S. Navy BIS trials at NAS Patuxent River, BuAir placed an order with Sikorsky for the first batch of production HSS-2 aircraft, which were to be placed in squadron service with VHS-10 in the Pacific and VHS-3 in the Atlantic, beginning in September of 1961.

The HSS-2, or HISS-2 as it would become known, production aircraft differed very little from the prototype. The major difference was in the use of 1,250 SHP General Electric T58-GE-8 engines in place of the lower horsepower T58-GE-6 engines, although the first twenty production aircraft were originally fitted with the T58-GE-6 engine. These aircraft were eventually retrofitted with the T58-GE-8 power plant.

As production quickened, orders were received for the HSS-2 Sea King from both Canada and Japan. Canada placed an order for forty-one with the first four being built by Sikorsky in the U.S. and the balance of thirty-seven being produced by United Aircraft of Canada. The Canadians designated their Sea Kings as CHSS-2 and later changed the designator to CH-124 and later (upon updating) to CH-124A.

On 12 August 1990, Canada announced that it would deploy three ships, with a helicopter complement, to the Persian Gulf in support of Operation FRICTION, the Canadian designation for Operation DESERT SHIELD. Since the Canadian CH-124As operated in a cold maritime environment, extensive modifications had to be made to its electronic, navigational, threat deterrent, and crew survivability for use in the high temperature, dust filled environment likely to be encountered in the vicinity of the Arabian desert operating area. A total of six CH-124As, out of the thirty-five remaining in the Canadian Forces inventory were modified in just ten days. They were deployed aboard the HMCS ATHABASKAN, PROTECTOR and TERRA NOVA with 423 Squadron. The modifications to the CH-124A included the fitting of a Forward Looking Infrared Radar (FLIR) 2000, ALQ-144 infrared jammer, M-130/ALE-37 chaff/flare dispenser and various radar/laser warning receivers plus a C-9 light machine gun mount for close-in self-protection. The Canadian CH-124As were used to patrol the Persian Gulf in support of the United Nations blockade of the area.

Japan ordered eleven HSS-2 for its Maritime Self-Defense Force during 1962. The first aircraft on the order was assembled completely in the U.S., the next two were partially assembled and the balance were assembled in Japan from U.S. supplied components.

During September of 1962, the designations of most all U.S. Armed Forces aircraft were changed as part of a DOD standardization program. As a result the U.S. Navy issued BuWeps instruction number 13100.7 that changed the designation of the HSS-2 to SH-3A. The new designators removed the manufacturers symbol from the designator.

The H-3A was used by the Navy in the Anti-Submarine Warfare (ASW) and Search and Rescue (SAR) roles, being designated as a SH-3A. The SH-3A could be armed with up to four Mk 46 or Mk 48 aerial torpedoes or a single Mk 101 LuLu 1,200 pound nuclear depth bomb or the Mk 57 510 pound nuclear free-fall bomb. In the ASW role the SH-3A was equipped with the Bendix AQS-10 or AQS-13 Dipping Sonar. When being flown in the ASW role the aircraft carried a normal crew of four; command pilot, co-pilot and two radar/sonar operators.

The SH-3A had a overall length of seventy-two feet nine inches including the rotor blades and an overall height of sixteen feet. In the ASW role, empty weight was 11,031 pounds and maximum take off weight was 19,100 pounds. Maximum speed was 159 mph with a normal cruising speed of 145 mph. The H-3A models were equipped with hydraulically folding rotor



A HSS-2 (SH-3A, BuNo 149685) of HS-6 Indians flies over the Pacific on a training mission. The Sea King was overall Gloss Sea Blue with an Orange band on the nose and another on the tail boom. (The Hook)

This HSS-2 (BuNo 149928) of HS-9 Sea Griffins was stationed aboard USS FORRESTAL (CVA-59) during the early 1960s. The sponson was painted Dark Blue with White stars and the name USS FORRESTAL. Additionally, the aircraft carried a Red, White and Blue band around the fuselage. (Navy via Mike Slover)





blades with a rotor diameter of sixty-two feet. The tail rotor boom could be folded flat against the starboard side of the fuselage for carrier stowage.

The SH-3A (HSS-2) set many speed records for helicopters. In December of 1961, just three months after joining the fleet, the SH-3A broke the 100, 500, and 1,000 kilometer course records with speeds of 199.01 (100), 182.8 (500), and 179.5 (1,000) mph respectively. In February, the SH-3A became the first helicopter to exceed 200 mph over a nineteen kilometer course (210.6 mph). Then on 6 March 1965 a SH-3A flew non-stop across the U.S., becoming the first helicopter to accomplish this feat. Taking off from the USS HORNET (CVS-12) in San Francisco Bay and landing on the USS FRANKLIN D. ROOSEVELT (CVA-42) fifteen hours fifty-two minutes and 2,116 miles later.

The U.S. Navy experimented with the Mid-Air Retrieval System (MARS) on a SH-3A (BuNo 149704) at NAS Point Mugu, California. The system consisted of two poles that extended from the fuselage sides, being retracted on the ground and extended below the fuselage in flight. The poles were fitted with grappling hooks to snag a parachute or balloon cable, which would then be reeled up to the fuselage. To prevent the parachute or balloon from becoming entangled in the sponsons, netting was placed over the forward sponson area to guide the catch. The MARS system would be used operationally to retrieve the SAMOS (Satellite and Missile Observation System) weather satellite camera capsules. The MARS system would later be used by the U.S. Air Force on CH-3C and CH/HH-3E to recover drones over Southeast Asia.

The basic H-3A was built in many different version for the U.S. Armed forces. Below are listed the various variants of H-3A:

## CH-3A

The CH-3A was an amphibian cargo/transport version built for the Navy and designated as the S-61A by Sikorsky. The CH-3A cabin could accommodate up to twenty-six troops, fifteen litters or up to 8,000 pounds of cargo. Three CH-3As (BuNos 149009, 149011 and 149012) were bailed to the Air force and re-serialized as 62- 12571-12573. They were eventually redesignated as CH-3Bs.

## HR3S-1

This designation was given to a never built proposal that Sikorsky made to the Marine Corps. Sikorsky designated their USMC privately funded proposal as the S-61R. The HR3S-1 would have been similar to the CH-3A, but would have featured a rear loading ramp for loading cargo, personnel and vehicles. The cabin would have accommodated up to twenty-seven troops or 8,000 pounds of cargo. The S-61R/HR3S-1 design would eventually be built for the Air Force as the CH-3C.

## NH-3A

A single NH-3A was built utilizing a SH-3A airframe (BuNo 148033). The fuselage was modified with a fairing over the boat hull and a streamlined rear fuselage, the landing gear sponsons were deleted and a pair of 3,000 lbst Pratt and Whitney J-60-P-2 turbojet engines replaced the tubroshaft engines. Thirty-two foot span wings were added to the fuselage sides, horizontal stabilizers were added to the tail rotor pylon and the main landing gear folded



**AU 61, an overall Dark Sea Blue SH-3A (BuNo 152126) attached to HS-3 Tridents flying out of Naval Air Station Quonset Point, Rhode Island. When deployed, the unit went aboard USS INTREPID (CVS-11) with CVSG 56. (Terry Love).**

upward into the jet pylon supports. The NH-3A first flew as a compound helicopter on 21 May 1965. In July of 1965 the NH-3A achieved a top speed of 242 mph with a modified rotor system that had six blades with reduced torque twist. The NH-3A was a joint Navy/Army project aimed at developing the compound helicopter to its fullest.

**CHINK 69 was the call sign of this SH-3A (BuNo 148992) of HS-2, flown by Lieutenant Steve Millikin when he rescued a downed pilot from Haiphong Harbor, North Vietnam under enemy fire. This mission earned Millikin the Silver Star. (Captain Steve Millikin, USN, Ret.)**







This SH-3A of HS-2 Golden Falcons operated off USS MAHAN (DLG-11) as a Search and Rescue (SAR) detachment. The Sea King was camouflaged in Dark Green, Tan and Gray and was armed with two GAU-23 Miniguns in the port and starboard doors. (Captain Steve Millikin, USN, Ret.)

## RH-3A

During early 1964 a contract was issued to Sikorsky to modify a SH-3A to the Mine Counter-Measures (MCM) role. In the event, a total of nine SH-3As were modified with A SH-3A of HS-2 is serviced after landing. The aircraft had previously been assigned to HS-8 and the crewman at the rear of the helicopter is painting out the former unit's markings. The Sea King is in overall Engine Gray with Black lettering. The only color on the aircraft is the national insignia. (Captain Steve Millikin, USN, Ret.)



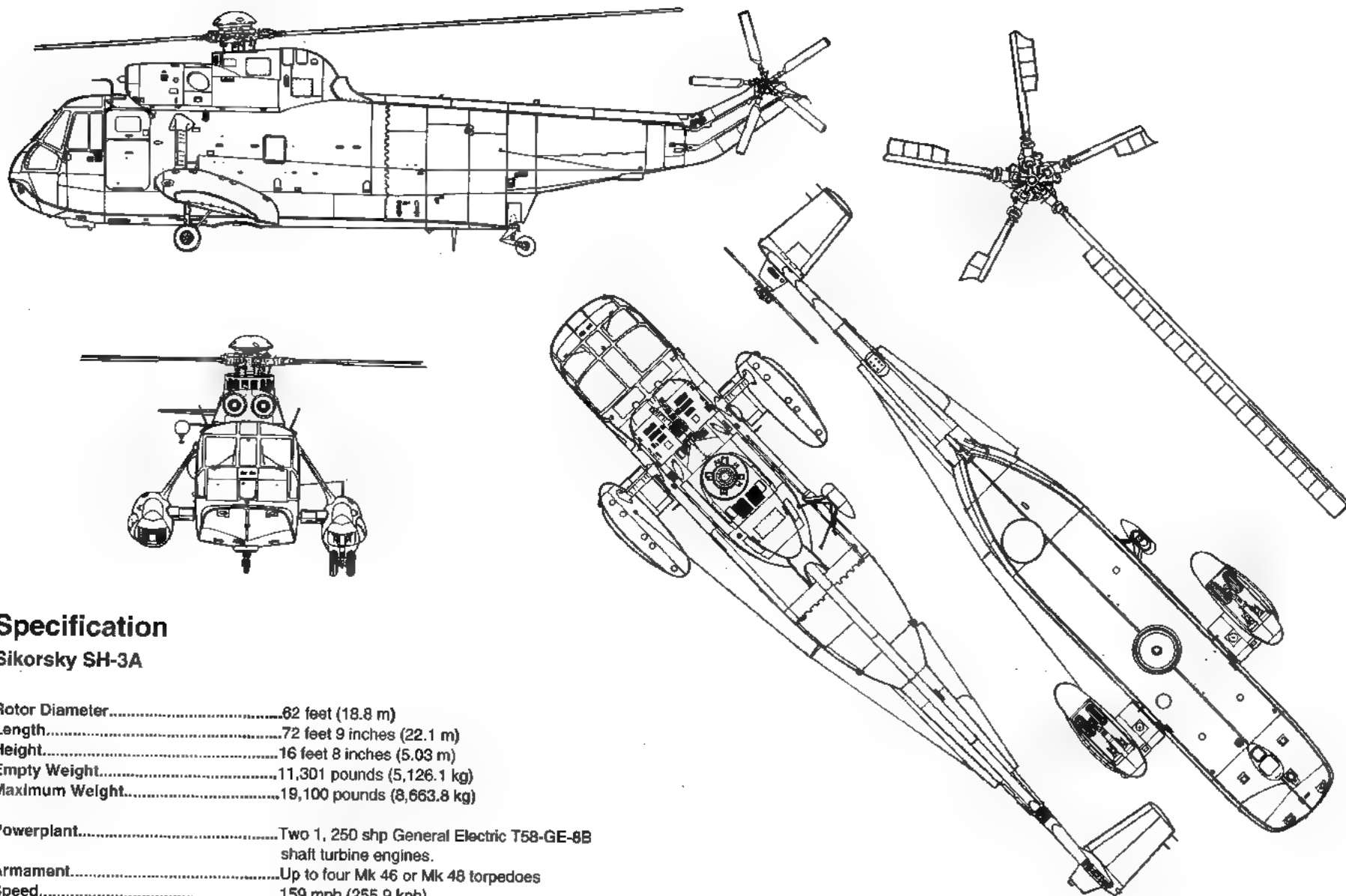
A SH-3A of HS-9 flies over the USS ESSEX (CVS-9) and USS LAKE CHAMPLAIN (CVS-39) during 1963. The aircraft was stationed aboard ESSEX and was finished in Gloss Sea Blue with an Orange nose and tail. (Navy via Ron Williamson)

removal of all ASW equipment and the addition of mine counter-measures equipment. Additionally a second cargo door was added to the port fuselage side and a pair of bubble windows were added to the rear fuselage sides for observers. The mine counter-measure equipment consisted of cable mounted tow gear that was mounted in the rear fuselage above the tail wheel. Three RH-3As were provided to the Atlantic, three to the Pacific fleet and three were used for test purposes. The RH-3As were used from both shore bases and mine counter measure ships. The development of the RH-3A eventually led to the much larger and more capable Sikorsky RH-53D Sea Stallion MCM helicopter.

## VH-3A

Originally designated as the HSS-2Z, the VH-3A is used as a VIP transport and was flown by a joint USMC/U. S. Army unit as the Presidential Flight. Eight CH-3A,s were specially equipped with galleys, air conditioning, airline type seats, toilets and additional radios. Due to the increased electrical demands of the added equipment, an Auxiliary Power Plant (APP) was added to the starboard sponson. In the early 1970s, the VH-3As were modified with a ice shield/foreign object deflector forward of the air intakes. The presidential flight was originally equipped with the VH-3A, but has since been upgraded to the CH-3D. Navy Helicopter Combat Support Squadron Two (HC-2) Circuit Riders, operated the Navy executive flight on the East coast. President Richard Nixon presented President Anhwad Sadat of Egypt one of the VH-3As for his personal use.





## Specification

### Sikorsky SH-3A

Rotor Diameter.....	62 feet (18.8 m)
Length.....	72 feet 9 inches (22.1 m)
Height.....	16 feet 8 inches (5.03 m)
Empty Weight.....	11,301 pounds (5,126.1 kg)
Maximum Weight.....	19,100 pounds (8,663.8 kg)
Powerplant.....	Two 1,250 shp General Electric T58-GE-8B shaft turbine engines.
Armament.....	Up to four Mk 46 or Mk 48 torpedoes
Speed.....	159 mph (255.9 kph)
Service Ceiling.....	15,000 feet (4,572 m)
Range.....	540 miles (869 km)
Crew.....	Four



# HH-3A

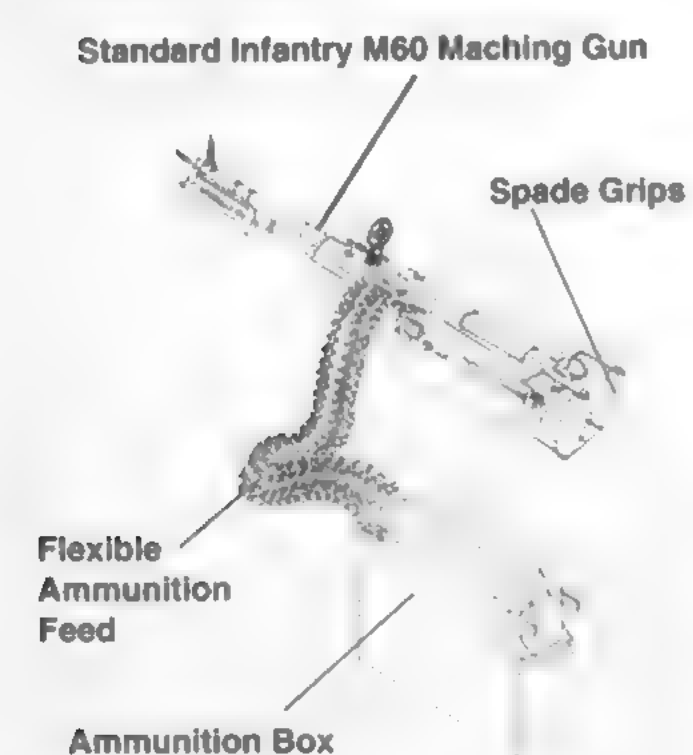
As the war in Southeast Asia heated up, increased onshore bombing missions were carried out by U.S. Naval air forces. A need arose for an armed and armored Search and Rescue (SAR) helicopter to handle rescue missions under hostile fire. As a result, twelve SH-3As were converted at NAS Quonset Point, Rhode Island to the Combat SAR role. The modifications included the removal of all ASW gear and the addition of armored titanium panels in the engine transmission areas, floor and armored seats for the flight crew. The avionics and hydraulic areas were also armored. Because of all the additional weight the engines were changed to more powerful General Electric T58-GE-8F engines and the aircraft was given provisions for the installation of 175 gallon fuel tanks mounted to the sponson supports.

For self-protection in hostile areas, the HH-3A was fitted with a pair of 7.62MM mini-guns, one on each side of the rear fuselage. The guns were controlled by gunners who were provided with bubble windows, similar to the windows fitted to the RH-3A. The gun barrettes were placed on the aft torpedo shackles and this was found to cause an aft Center of Gravity (CG) problem and they were eventually replaced by GAU-2B/A 7.62MM mini-guns on mounts behind armored doors in the port forward and starboard cargo door areas. The hand held guns were provided with 6,000 rounds each in 1,500 round canisters. The GAU-2B/A had a firing rate of 2,000 or 4,000 rounds per minute.

The HH-3As originally entered service with Helicopter Combat Support Squadron Seven (HC-7) Big Muthas. The HH-3A were operated well into the 1980s, when it was replaced by

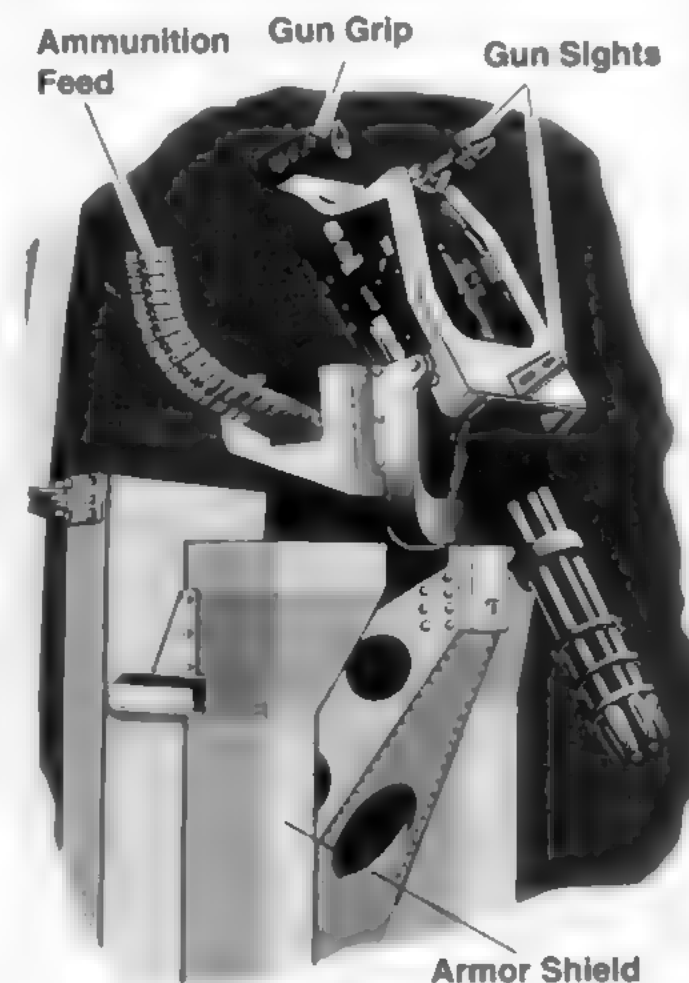
## SAR SH-3 Armament

### M60 Door Guns



Note: On SAR SH-3As the M60s Were Mounted On Top Of Armor Shields With Ammunition Feed And Boxes Stored Behind The Shield.

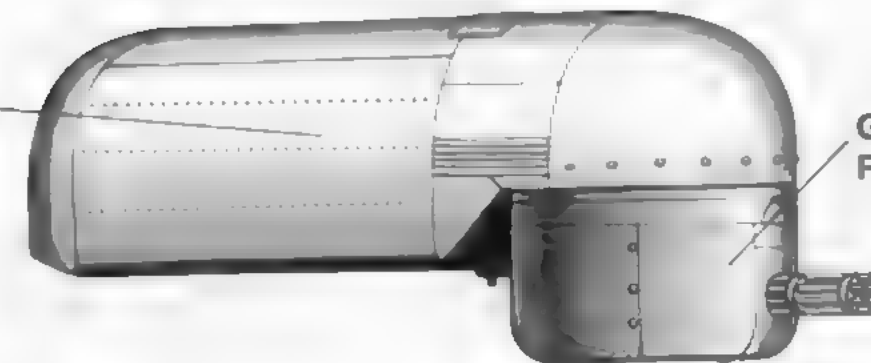
### GAU-2B/A Minigun Mount



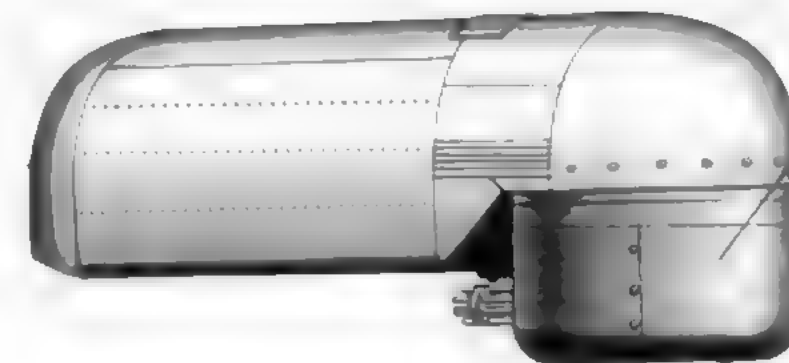
## HH-3A Armament

### GAU-2B/A 7.62MM Minigun Barrbett

Ammunition  
Storage Area  
(6,000 Rounds)



Gun Turret In  
Ready Position



Gun Turret In  
Stowed Position

This armored Minigun mount was carried on the SAR variant of the SH-3A. There were two guns carried, one in the main cargo door and another in the crew entry door on the port side. Each gun had a total ammunition supply of 6,000 rounds of 7.62MM ammunition. This same mount was later added to HH-3As when the barbette mounted weapons proved unsatisfactory. (Nicholas J. Waters III)





Some thirteen SH-3As were modified by adding armor, external fuel tanks and a pair of Minigun barbettes. The barrette contained a 7.62mm GAU-2B/A Minigun and 6,000 rounds of ammunition. This HH-3A was attached to HC-7 Big Muthas. (Terry Love)

The HH-3A continued to serve with the reserve until 1990, when HC-9 Protectors was formally disestablished. This HH-3A (BuNo 149916) was finished in overall Gloss Sea Blue with a Yellow band around the tail boom. (Terry Love)



The original HH-3A prototype (BuNo 149896) on the ramp at Sikorsky. The aircraft had additional armor, two Minigun barbettes and two 175 gallon external fuel tanks. In service the barbettes proved to be ungainly and hard to aim and were later replaced by door mounted weapons. (Sikorsky)

the HH-60.

A total of 245 H-3A versions were produced by Sikorsky at the Stratford, Connecticut plant. Over 150 SH-3A models were updated to the SH-3G and SH-3H standards and two SH-3As were updated to SH-3D standards. The H-3A will continue to fly well into the 21st century as the VH-3A, since it is the only helicopter in the Navy inventory of sufficient size, operating range and cost per mile efficiency to operate in the executive flight role.

A pair of SH-3As of Helicopter Combat Support Squadron Two (HC-2) come in for a landing aboard USS CONSTELLATION (CVA-64) in the Gulf of Tonkin on 17 January 1970. HC-2 saved over fifty downed airmen during the Vietnam War. (Navy)



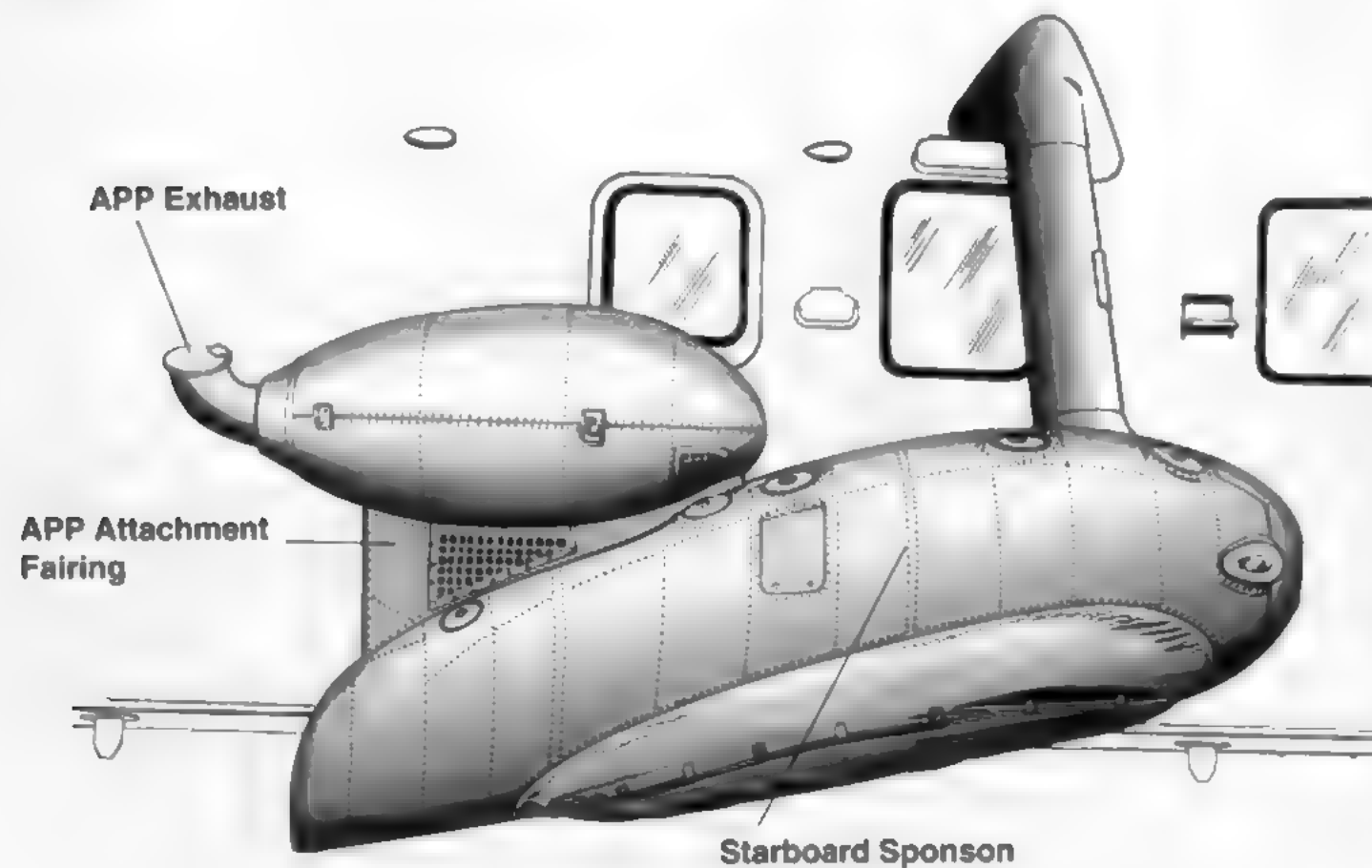




A VH-3A (BuNo 150613) of HC-2 rests on the grass pad at the Pentagon awaiting its VIP passengers. HC-2 flies high ranking officials around the Washington area. Their Sea Kings are painted Gloss Olive Drab with White stripping. (Stu Jones)

## Auxiliary Power Plant (APP)

VH-3A



NASA used this SH-3A (BuNo 149723) to flight test the nose mounted APN 215 search radar that would later become a standard feature on Coast Guard HH-3F Pelican SAR helicopters. The aircraft was in overall Gloss White with Blue striping. It carried the legend Sea King on the sponson in Red. (Terry Love)

The NH-3A (BuNo 148033) was an experimental airframe used by a joint Army/Navy team to explore the merits of compound helicopter technology and flight characteristics. The Sea King was modified with the addition of thirty-two foot wings, and two Pratt & Whitney 3,000 lbst turbojets. (via Paul Novak)





Sikorsky modified nine SH-3As with mine clearing equipment under the designation RH-3A. RH-3As were used aboard mine-countermeasures ships to extend the range of mine sweeping operations. This RH-3A served aboard USS THOMAS J. GRAY (DER-326). (via Paul Novak)

The first example of the Canadian CHSS-2 (4001) built for the Canadian Naval Forces undergoes a test flight. Later the designation was changed to CH-124 to conform to a new designation system. (Sikorsky)



Mitsubishi of Japan obtained a license to produce the SH-3A under the designation HSS-2. The first three were assembled in the U.S. with the remaining aircraft being assembled in Japan. The aircraft carried a Gloss White over Gray color scheme. (Terry Love)

In August of 1990 Canada modified their CH-124s with a nose mounted Forward Looking Infrared (FLIR), chaff and flare dispensers and other sensors. These aircraft were deployed to the Persian Gulf as part of Operation FRICTION, the Canadian version of Operation DESERT SHIELD. (Canadian Armed Forces)





# CH-3B

In 1962, the U.S Air Force found it needed a helicopter with enough range and payload capacity to be able to fly out and resupply the Texas Tower radar sites located out in the Atlantic Ocean off of the New England coast, as well as be able to recover drones. As a result, three U.S. Navy CH-3A (BuNo 149009, 149011 and 149012) were bailed to the USAF and used by the 4756th Drone Squadron, located at Tyndall AFB, Florida. The new CH-3As were reseried as 62-12571 through 62-12573. The USAF was so impressed with the range, performance and utility of the CH-3A that they requested that Sikorsky build three CH-3A for use by the 551st Base Flight at Otis AFB, Massachusetts for resupply of the Texas Tower radar sites.

The new production CH-3As were seriated 62-12574 through 12576 and were designated CH-3Bs and corresponding to that change the first three CH-3As were also redesignated CH-3Bs. The CH-3B (S-61A) had an empty weight of 9,763 pounds and a maximum loaded weight of 20,000 pounds. The CH-3B weighed less than the SH-3A since it carried no ASW equipment. The CH-3B was powered by a pair of General Electric T-58-GE-10 shaft turbine engines rated at 1,400 SHP. This gave the CH-3B a top speed, at it's maximum weight, of 159 mph.

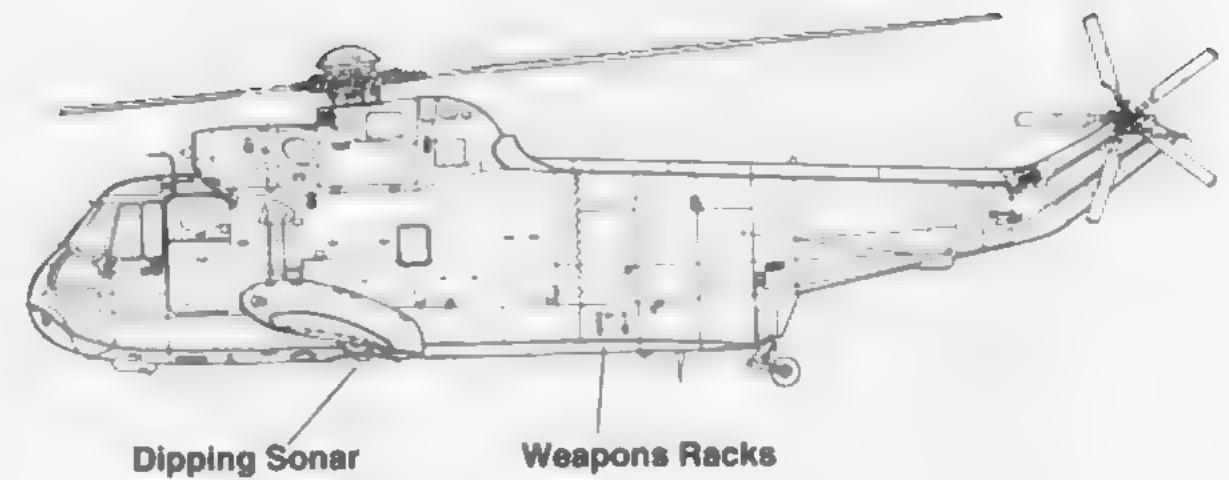
Not long after acceptance by the USAF, the number four CH-3B (62-12574) dubbed the Otis Falcon, flew from Otis AFB, Massachusetts to Paris, France. The flight began on 27 May and culminated on 5 June 1963. Total flight time was 35.5 hours and included stops in Labrador, Canada, Greenland, Iceland, and Scotland before landing in Paris. The flight broke the helicopter record for the Atlantic crossing in terms of speed and distance traveled.

The U.S. Navy bailed three CH-3As to the Air Force for use in recovering drones at Tyndall Air Force Base, Florida. The USAF changed the serial number from BuNo 149009 to 62-12571. The first of the three aircraft was finished in standard Navy colors. (USAF)

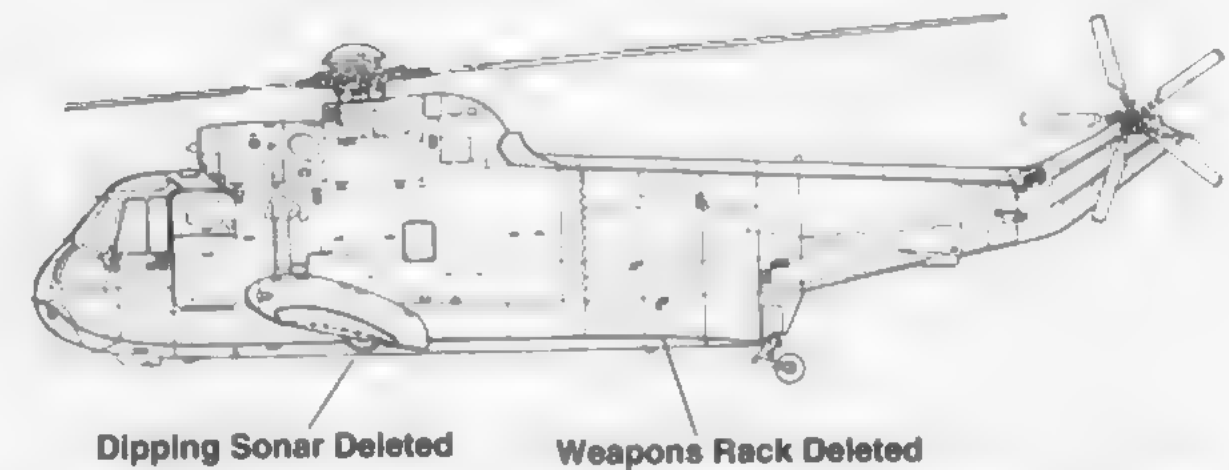


## Fuselage Development

SH-3A



CH-3B



The third CH-3A was ex-BuNo 149012 and is was reseriated as 62-12573. The aircraft served at Otis AFB, Massachusetts as part of a test program aimed at using the CH-3 as a supply helicopter for the Texas Tower radar sites located out in the Atlantic Ocean. (USAF)



The Danish Air Force (*Kongelige Danske Flyvevaaben*) ordered eight CH-3Bs and used the Sikorsky S-61A model number as their designator. Externally the Danish S-61A differs from the CH-3B in two major respects. The sponsons are much larger, since the Danes chose the sponsons used on the Sikorsky model S-61N civil variant for added stability in rough water operations, and in the addition of five cabin windows for more observation stations.

The Danish S-61As have served with *Eskadrille 722* out of Vaerlose in the SAR role since their service introduction. The S-61As have been modified and upgraded with the addition of color weather/search radar and an ice/FOD shield in front of the engine air intakes. Originally delivered in Natural Metal with Orange identification panels, the S-61As are now finished in a Medium and Dark Gray tactical scheme.

The Royal Malaysian Air Force (*Tentara Udara Diraja Malaysia*) ordered thirty-five CH-3B in 1967 under the designation S-61A-4 and renamed the Sea King, the Nuri. The Malaysian S-61A-4s are used in the tactical assault, SAR, and cargo roles. S-61A-4 Nuris are equipped with rescue hoists, auxiliary fuel tanks, and provisions for up to thirty-one seats. Beginning in 1992, thirty-four of the Nuris were upgraded with a supplemental avionics package consisting of weather radar, a Doppler navigation system and a radar altimeter. This avionics package increased the operational capability of the Malaysian S-61A-4s and will



The USAF produced three new production CH-3As under the designation CH-3B. This CH-3B (serial 62-12574) was dubbed the Otis Falcon and was flown trans-Atlantic from Otis AFB, Massachusetts to Paris, France during 1963. The aircraft was overall Silver Dope with Black lettering. (USAF)



The number six CH-3B (serial 62-12572) hovers over a Ryan BQM-34 Firebee drone in the Gulf of Mexico off Tyndall AFB, Florida. The CH-3B was assigned to the 4756th Drone Squadron. (Sikorsky)



enable the TUDM to fly the S-61 well into the 21st Century.

One CH-3B (S-61A) was delivered to a civilian user as a construction helicopter. The number 4 and 5 USAF CH-3Bs, serial number 62-12574 and 12575, were bailed to the U.S. Navy and converted to SH-3H standards with full ASW capability. The converted CH-3Bs were used by Helicopter Anti-submarine Squadron Ten (HS-10) on the Pacific coast. HS-10 operates as the fleet replacement and training squadron for the Pacific fleet out of North Island, California.

(Right) A S-61A of the Danish Air Force prepares to take off from its helo pad. The Danes used the S-61 designation rather than the CH-3B designation and modified their Sea Kings with larger sponsons and additional cabin windows. (Dave Menard)

An overall Natural Metal S-61A (U-277) lifts a swimmer during a rescue demonstration. S-61As of the Danish Air Force were later modified with a nose mounted search radar and an ice deflector in front of the engine intakes. (Danish Air Force)



A S-61A of the Danish Air Force flies along the Danish coast on a search and rescue mission. The aircraft carries the later paint scheme of Dark Gray over Light Gray. All S-61As in Danish service have been upgraded to SH-3G standards. (Danish Air Force)



# H-3C

In late 1962 the USAF issued a request for proposals (RFPs) for a cargo helicopter that could lift 7,000 pounds and be able to load cargo as large as a standard jeep. Sikorsky responded to the request with a variant of the H-3 with the company designation S-61R. On 17 June 1963 the USAF placed an order for twenty-two Sikorsky model S-61Rs under the designation CH-3C.

The CH-3C (S-61R) was a development of an earlier Sikorsky design for the U.S. Marine Corps, the HR3S-1. The HR3S-1 had been in development for the USMC since 1958 and had been the front runner in the competition to replace the HUS (UH-34) utility helicopter, a competition that was eventually won by Boeing-Vertol with their model 107M (CH-46).

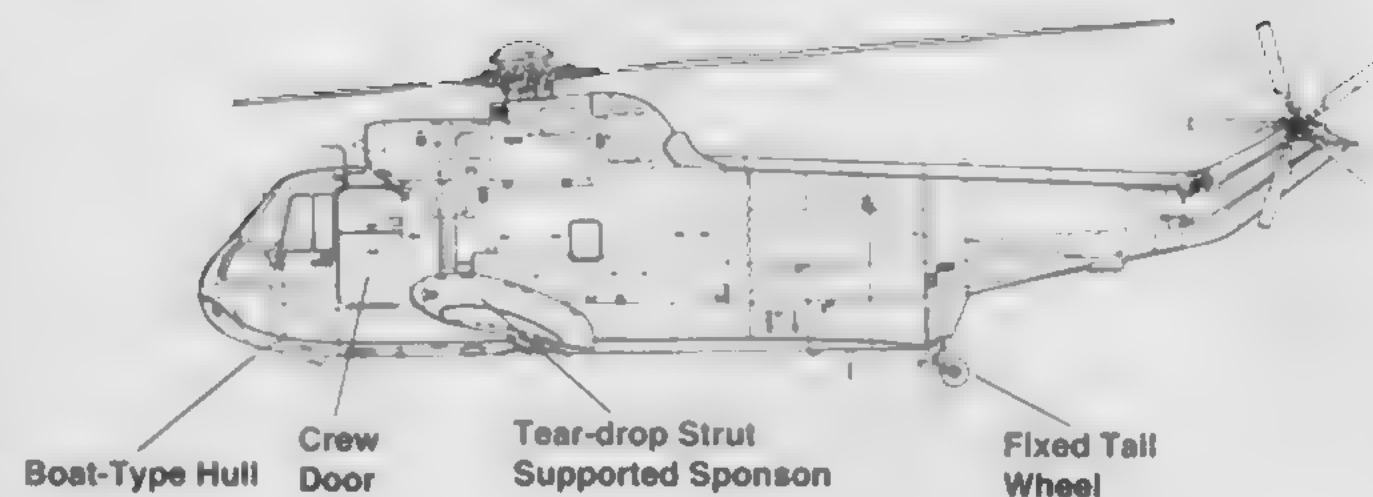
The CH-3C was an extensively modified H-3, that featured a redesigned fuselage with a hydraulically operated rear loading cargo ramp and a tricycle landing gear with fully retractable main and a partially retractable nose gear. The main gear retracted into sponsons that were fitted flush to the fuselage sides, unlike the sponsons on the earlier H-3A/Bs had the sponsons fitted to supports. An Auxiliary Power Unit (APU) was fitted for independent field operations. A 2,000 pound wench was carried internally to assist in the loading of bulky

The prototype CH-3C (62-12577) on the ramp at Edwards Air Force Base, California during 1962. The aircraft underwent its service test and evaluations at Edwards and was equipped with an air data probe on the top of the rotor head for the tests. The aircraft was overall Natural Metal with Black lettering. (USAF)

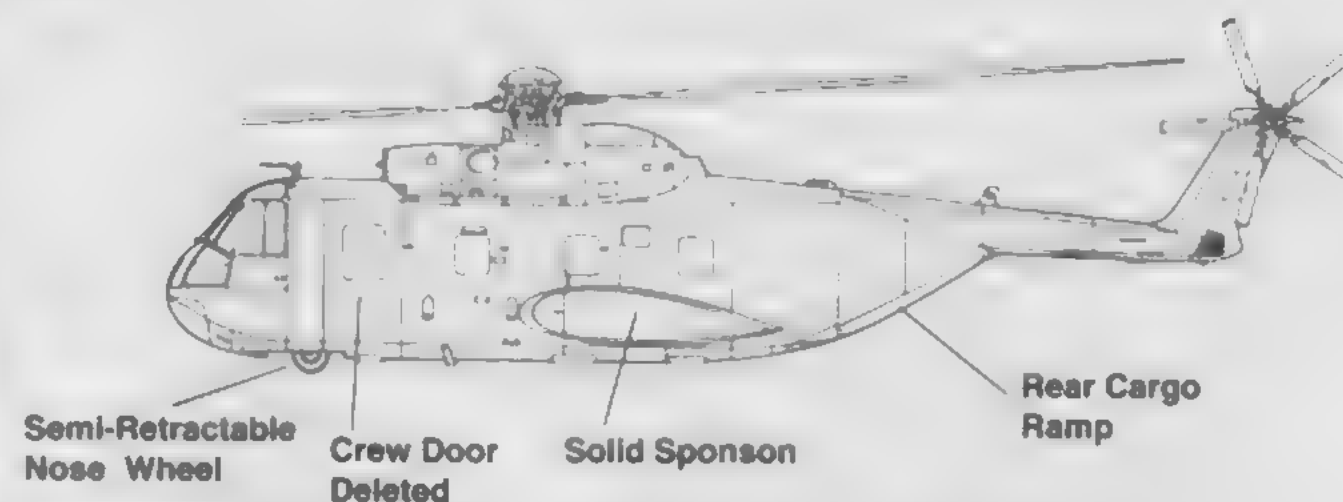


## Fuselage Development

### SH-3A



### CH-3C



The CH-3C (serial 62-12577) prototype was used to test an ice/FOD deflector at Edwards during the early 1970s. The aircraft carries the badge of the 6512th Test Squadron on the forward fuselage under the cockpit windows. One of the main differences between the CH-3C and earlier H-3s was the rear cargo ramp. (USAF)







**A CH-3C demonstrates the hoist method of rescue by hoisting an airman in a horse collar that is suspended from a 240 foot cable. This method of rescue was used during the early part of the Vietnam war to rescue downed pilots from the jungle. (via Art Napolitano)**

cargo. The CH-3C was also fitted with an external rescue hoist and provisions for external cargo sling loads. The rotor blades were pressurized for quick and easy inspection for flaws and damage. Unlike the USMC version and the earlier H-3A/B, the rotor blades would not fold. The rotor system did have self-lubricating main and tail rotor bearings.

The CH-3C was powered by a pair of General Electric T-58-1 shaft turbines that produced 1,250 shp. The engines drove the five bladed main rotor and tail rotor through a free wheeling transmission. The transmission was equipped with a rotor brake to slow rotor rotation upon landing. The CH-3C had a maximum speed of 165 mph and a normal cruising speed of 154 mph. Service ceiling was rated at 11,000 feet and it had a range of 500 miles. Empty weight was 11,933 pounds and maximum take off weight was 22,000 pounds. The overall length, including rotor blades, was 73 feet and fuselage length was 57 feet 3 inches. Overall height was 18 feet 1 inch. Total fuel capacity was 640 gallons, carried in two bladder type fuselage tanks under the load floor area.

The CH-3C could carry up to twenty-five troops or 7,567 pounds of cargo and was fully amphibious. An external cargo sling hoist was fitted that could accommodate up to 8,000 pounds and it was provided with an emergency jettison capability.

The first CH-3C flew on 17 June 1963, and received a FAA Type approval on 30 December 1963, the same day that it was accepted by the USAF at Tyndall AFB, Florida for drone recovery duties. A total of seventy CH-3C were built in six serial number blocks and were



**A CH-3C (63-9678) lifts a sling loaded Jeep at Eglin Air Force Base, Florida during early 1963. The CH-3C could lift up to 8,000 pounds on its external cargo hook. The loadmaster/crew chief keeps an eye on the load and if it were to become unstable he could jettison the entire load with the push of a button. (USAF via Rodney Bankston)**

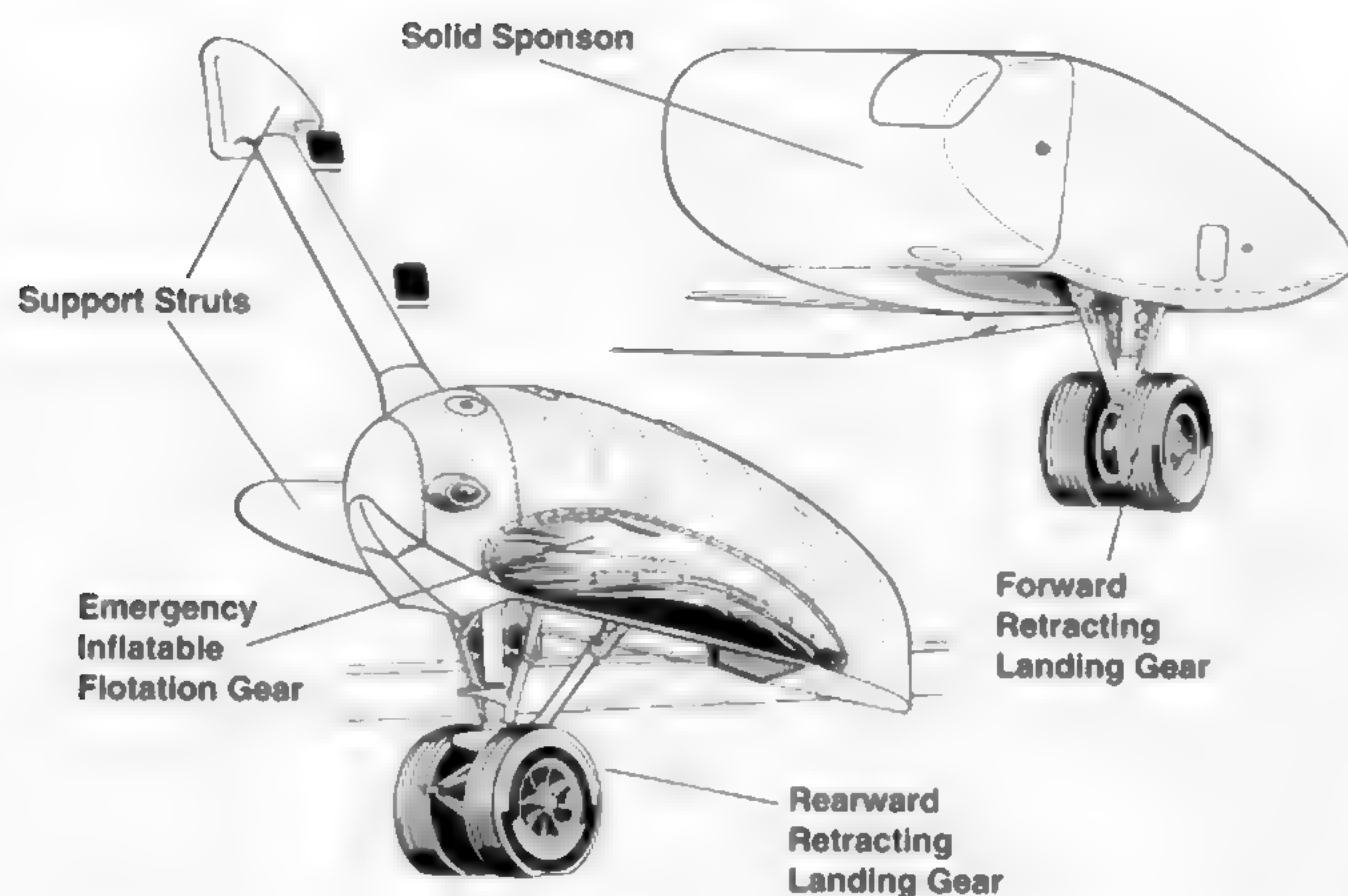
The first aerial refueling tests with a modified CH-3C took place during December of 1965. The standard CH-3EC was modified with a refueling boom mounted in the center of the nose and was refueled by a Marine Corps KC-130F from VMGR-252, at MCAS Cherry Point, North Carolina. The success of these tests led to the production refueling package used on the HH-3E. (Sikorsky)



## Sponson Development

SH-3D

CH-3C



CH-3Cs, like this aircraft (64-14221) were initially supplied to the Tactical Air Command for use in range support duties. This aircraft is overall Green with a Red and Yellow box painted on the fuselage side as a recognition aid. (USAF)



A few CH-3Cs were modified to carry 175 gallon external fuel tanks to extend their range for Search and Rescue missions. This CH-3C (serial 64-14277) was painted in Southeast Asia camouflage of two Greens and Tan over Light Gray. The nose wheel of the CH-3C was not fully retractable. (Sikorsky via Mutza)

initially provided to the USAF Aerospace Defense Command (ADC), Air Training Command (ATC), Tactical Air Command (TAC), Strategic Air Command (SAC) and the Air Rescue Service (ARS). On 8 January 1966, the Air Rescue Service became the Aerospace Rescue and Recovery Service (ARRS).

The first use of the CH-3C in the air rescue role was by Detachment I of the 38th Air Rescue Squadron in Southeast Asia. The CH-3Cs were on loan from the Tactical Air Command's Tactical Air Warfare Center and they arrived in Nakhon Phanom (NKP), Thailand on 6 July 1965. Eventually, the 3rd Aerospace Rescue and Recovery Group took over the task of aerial rescue in all of Southeast Asia with operating squadrons at Tan Son Nhut, Danang and Tuy Hoa, South Vietnam.

On 8 October 1965 the 20th Helicopter Squadron was formed at Tan Son Nhut Air Base, Saigon, South Vietnam expressly for artillery support, med-evac and small aircraft recovery duties. Originally fourteen CH-3C, dubbed Big Charlies were used by the 20th, until ten were sent to Nakhon Phanom, Thailand to start the *Pony Express*, a covert operation in Cambodia and Laos in support of U.S. Special Forces along the Ho Chi Minh trail. All of the CH-3C were painted in an overall Black scheme or very dark camouflage and one (serial 63-9676) was called the *Black Maria* (as in the song "They call the wind Maria"). The *Black Maria* operated in this clandestine role out of Nakhon Phanom until 1972, when she was returned to the United States. At one time during her service in Southeast Asia, a bounty of 50,000 U.S. dollars was placed on the *Black Maria* by the Viet Cong, to be paid to any soldier that could shoot her down, no one collected that bounty. After serving with the 302nd ARS and the 71st SOS, *Black Maria* was transferred to the Air Force Museum located at Wright Patterson AFB.





**A CH-3C of the 37th Air Rescue Squadron on the ramp at Danang Air Base, South Vietnam. The 37th ARS was activated at Danang to operate in I and II Corps of South Vietnam as well in North Vietnam. The CH-3C had a top speed of 180 mph and could carry up to twenty-six troops. (USAF)**

Ohio, where she proudly sits on display.

Operations by the ARS showed a need for greater range, endurance, and armor protection. Out of this need was created the HH-3C, an armed and armored version of the CH-3C.

## HH-3C

The HH-3C was a basic CH-3C model, modified to be more effective in the rescue and recovery role. The HH-3C was fitted with two external 200 gallon fuel tanks on the sponsons, additional fuel tankage in the sponsons, armor protection for vital engine and transmission parts, plus armor protection for the crew. The flight crew were seated in armored seats and other various crew station were also armored. The aircraft was armed with 7.62MM M60 machine guns in fuselage side windows and a 7.62MM M60 was mounted on the cargo ramp. A total of twelve CH-3Cs were brought up to HH-3C standards and four of them were destroyed in Southeast Asia operations.

In 1965, the USAF, in conjunction with the USMC at Marine Corps Air Station Cherry Point, North Carolina began testing a CH-3C modified with the probe and drogue aerial refueling system used by the USMC/USN. Using a KC-130F tanker from VMGR-252 and a modified CH-3C, ten contacts were made, with one contact lasting five minutes. The tests took place at 4,000 feet and at a speed of 105 knots. The CH-3C was fitted with a refueling boom in the center of the nose area. The tests were successful and this led to the development of the HH-3E. Tests, however, showed that the nose mounted boom was a bit unstable and should be moved to the side of the fuselage for greater stability and also to incorporate a retractable feature so the boom could be extended for tanking and retracted when not in use.



**A CH-3C flies over the jungles of South Vietnam on a rescue mission. The external fuel tanks gave the CH-3C additional range to make the long missions into North Vietnam to rescue downed airmen. (USAF)**

The HH/CH-3C was used to recover Ryan Remotely Piloted Vehicles (RPVs or drones) in mid-air utilizing the Mid-Air Retrieval System (MARS) over Southeast Asia. The MARS system was first used, and developed for the USN SH-3A. Drones would be launched by Lockheed DC-130s, flown to their target by drone controllers and then returned to a recovery area to be snagged in mid-air by the H-3Cs. The MARS system was used from 1964 to 1975 and over 2,655 drones were successfully recovered using this method. The MARS system was fitted to the aft fuselage sides in the section above the cargo door/ramp and consisted of two rods from which a grappling cable was fitted. The cable was fitted with snag/grappling hooks to snag the parachute cable suspended from the drone.

All of the CH-3C/HH-3C models delivered to the USAF were eventually brought up to HH-3E standards, either as CH-3Es or HH-3Es.

All of the CH-3C/HH-3C models delivered to the USAF were eventually brought up to HH-3E standards, either as CH-3Es or HH-3Es.

## JCH-3C

The JCH-3C was a development of the CH-3C and the fifth production CH-3C (serial 62-12581) was used in the program. The JCH-3C was used for service tests with the Aeronautical Systems Division (ASD) at Wright-Patterson AFB, Ohio. The JCH-3C was used to test the ice shield/foreign object deflector in front on the engine air intakes and the new bifilar absorber assembly on the main rotor head, as well as many of the new features and upgrades used on the CH/HH-3E models.



# SH-3D

During the 1966 production run of SH-3As (S-61Bs) for the U.S. Navy, one aircraft (BuNo 152139) was taken from the line and fitted with increased horsepower General Electric engines under the designation YSH-3D. The aircraft had 1,400 shp T-58-GE-10 replacing the earlier 1,250 shp T-58-GE-8 engines used on the SH-3A. Other improvements included an additional fuel tank with a capacity of 140 gallons in the fuselage, and an enlarged area horizontal stabilizer with a supporting strut. Variable torpedo launch rails were introduced that permitted the launching of torpedoes while the helicopter was in a hover. Torpedo carriage was reduced to two from the previous four carried on the SH-3A.

The SH-3D was equipped with Bendix AQS-13 sonar with a 180 degree search beam width.

**A SH-3D (BuNo 152708) searches for a submarine contact with its Bendix AQS-13 dipping sonar. The sonar was attached to a cable that was mounted on a reel in the fuselage. The aircraft was overall Gloss Sea Blue with White lettering. (via Paul Novak)**



**A SH-3D (BuNo 152711) of HS-4 Black Knights off the USS HORNET (CVS-12) recovers Apollo astronauts from the Pacific Ocean. This SH-3D recovered astronauts from five different missions, more than any other helicopter. The astronaut is being hoisted in a Billy Pew recovery net. (National Archives)**

The sonar was coupled to an automatic altitude stabilization system through the Ryan AP-130 Doppler radar, radar altimeter and the Hamilton Standard auto stabilization equipment.

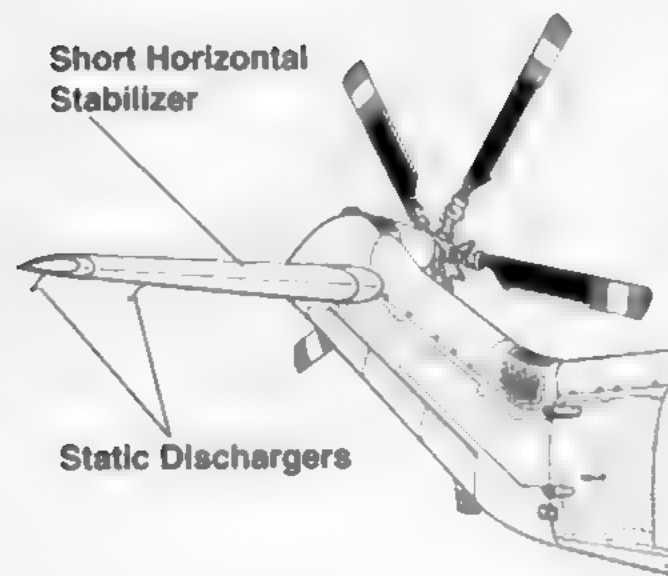
The SH-3D was delivered in two different versions for the U.S. Navy. One version was used as a utility helicopter in the Search and Rescue role and most notably in the recovery of astronauts in the Apollo program. One SH-3D (BuNo 152711) that served with HS-4 in the Pacific participated in no less than five recoveries with the Apollo program. The utility version of the SH-3D lacked the ASW equipment of the sub-hunting version. The ASW gear consisted of a Texas instrument ASQ-81(V) MAD (Magnetic Anomaly Detector) towed body TB 623, that was carried under the rear of the starboard sponson. Other ASW gear consisted of the AQS-13 dipping sonar and various sonabouys.

A total of seventy-three SH-3Ds were produced by Sikorsky for the Navy and two SH-3As (BuNo 148998 and 151544) were brought up to SH-3D standards. The SH-3D was built for three foreign armed forces. The Spanish Armada purchased twenty-two in two separate batches, the first six were ex-BuNo 153532 through 153537 and given Spanish designations of Z.9-1 through Z.9-6. The second purchase were designated as Z.9-7 through Z.9-22. They have served aboard the aircraft carrier PRINCIPE OF ASTURIAS that replaced the older car-

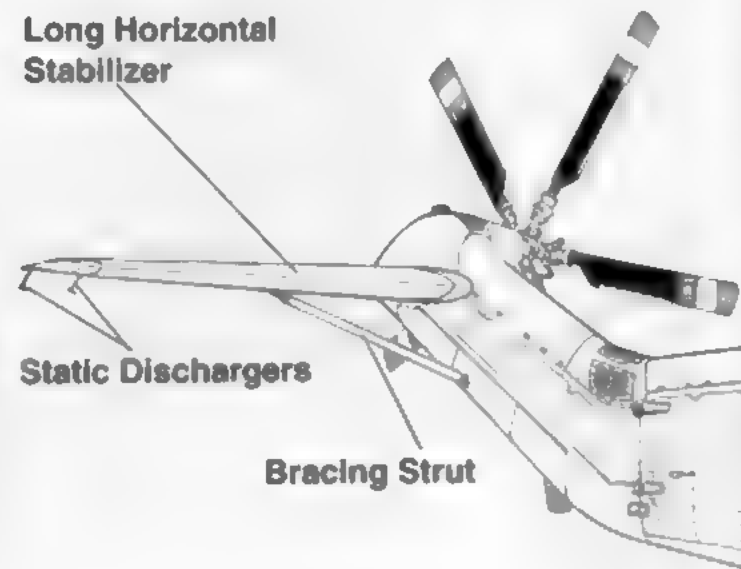


## Horizontal Stabilizer Development

SH-3A



SH-3D



rier DEDALO. Three of the Spanish SH-3D have been modified with the Thorn-EMI search radar that is very similar to the British Sea King radar system. Argentina purchased four SH-3Ds under the designation S-61D-4 and they serve aboard the carrier 25 DE MAYO with Helicopter Wing 4 *Escuadrilla*. Brazil took delivery of twelve SH-3Ds for use aboard their carrier MINAS GERAIS (ex-British COLOSSUS).

This SH-3D of HS-4 is streaming its MAD body out from its well in the starboard sponson. HS-4 was stationed aboard USS KITTY HAWK (CV-63) operating off North Vietnam in the Gulf of Tonkin. (Nicholas J. Waters III)



A SH-3D (BuNo 154112) hovers over the USS GLENARD P. LIPSCOMB (SSN-685) in the South China Sea off the coast of South Vietnam. The Sea King was bringing an officer to the submarine to replace one that had become ill and needed treatment in the sickbay aboard USS KITTY HAWK (CV-63). The SH-3D carries the White over Gray scheme adopted by the Navy during the mid-1960s. (Nicholas J. Waters III)

The SH-3D has been license produced in England and Italy. Westland Helicopters located in Yeovil, Somerset, England has produced over 300 Sea Kings in twenty-five different versions for the Fleet Air Arm, Royal Air Force and eight other armed forces. Agusta of Milan, Italy has produced the Sea King in three different versions. The SH-3D version for ASW and SAR work, a VIP version, and two civilian models, the AS61 Silver and the AS-61N1. The Agusta versions are powered by the 1,500 shp General Electric T-58-GE-100 turboshaft engines while the Westland Sea Kings are powered by the license built Rolls-Royce Gnome engines.

Helicopter Combat Support Squadron Sixteen (HC-16) Bullfrogs was the last active U. S. Navy squadron to fly the SH-3D, turning in their Deltas for the SH-3H variant during 1992. All ASW gear has been removed from the SH-3H leaving room for cargo and personnel. One of the newer SH-3Hs was BuNo 148049, an ex-SH-3A that had been originally produced during 1960. HC-16 operates as the SAR squadron supporting NAS Pensacola and Tyndall and Eglin Air Force Bases, Florida on the Gulf of Mexico. HC-16 also had a detachment that supported the training carriers USS LEXINGTON (AVT 16) and USS FORRESTAL (CV-59).



**A SH-3D of HS-8 Eight Ballers is towed across the deck of USS KITTY HAWK (CV-63). The SH-3D was used for both utility and ASW duties. (Nicholas J. Waters III)**

operating as their plane guard while students practice carrier landings, leading to their carrier qualifications.

## VH-3D

Eleven VH-3Ds were ordered to replace the VH-3As used in the Presidential and Executive flights. The Executive flights are jointly operated by the U.S. Army and Marine Corps. The VH-3D featured port fore and aft doors with built in steps, an improved auxiliary power plant and interior seating arrangements. A larger picture window was installed for increased view.

**Marine One** is the call sign of this VH-3D whenever the President is actually flying onboard. HMX-1 is the Marine unit responsible for operating the VH-3Ds of the presidential flight. (Terry Love)



**A pair of SH-3Ds of HS4 Black Knights fly over the South China Sea on an ASW mission out in front of the USS KITTY HAWK (CV-63). When the attack carriers began operating ASW units in addition to their attack units, they changed their designations from CVA to CV. (Nicholas J. Waters III)**

The VH-3D was also equipped with a galley, toilet and air conditioning. Up-rated General Electric T58-GE-10 engines were also fitted and an ice deflector was placed in front of the engine air intakes to prevent ice ingestion. HMX-1 is the designated Marine Corps squadron charged with safely flying the President and operates the VH-3D. Recently the VH-3D was upgraded with a Global Positioning System (GPS) for accurate navigation in any weather. President Gerald Ford was the first President to fly in the VH-3D during 1976.

**This SH-3D was used by NAS Whidbey Island, Washington in the SAR role until replaced by the utility variant of the SH-3H. The aircraft is in the basic White over Gray scheme with a Red nose and tail boom. (Terry Love)**





# H-3E Jolly Green Giant

The H-3E was a development of the H-3C, Sikorsky model S-61R, with uprated 1,500 shp General Electric T-58-5 engines. The H-3E was built in two different versions; the CH-3E, a cargo/transport version and the HH-3E, the armed and armored SAR aircraft. Both versions retained the rear cargo loading ramp and the large external sponsons of the CH-3C. The sponsons were for stabilization in water and to provide a fairing for the retractable main undercarriage. The sponsons also acted as an attachment point for the 200 gallon external fuel tanks on the HH-3E models.

The higher horsepower engines on the H-3E allowed for a higher gross takeoff weight, up to 22,500 pounds. The increased horsepower of the T-58-GE-5 engines came in very handy in the high, hot operating conditions of Southeast Asia.

The CH-3E began operations in South Vietnam during 1966, flying out of Danang Air Base and Nakhon Phanom (NKP), Thailand. The CH-3Es were used to resupply various U.S. Army and Marine Corps outposts and were also called upon to perform air rescue duties.

The HH-3E were purpose built for Aerospace Rescue and Recovery duties. The basic CH-3E airframe was modified to include the addition of over 1,000 pounds of Titanium armor plate for the protection of the pilot, co-pilot, and various mechanical components such as the engines, transmission, oil coolers, and hydraulic systems. The canopy was shatterproof and the gunners were provided with armor plate. The HH-3E was used to rescue downed airmen, whether on land or water and therefore the fuselage was made waterproof for water landings. The HH-3E was armed with up to three 7.62MM guns and some were also fitted with a .30 caliber machine gun for added protection. The usual placement was a gun in the left forward fuselage window opening, one in the right cargo door and one on the cargo ramp.

An overall Light Gray HH-3E (69-5800) of the Aerospace Rescue and Recovery Service. The aircraft had a Red nose and a Red band around the tail boom. This was the standard scheme for HH-3Es, except for those aircraft serving in Southeast Asia. (Sikorsky)

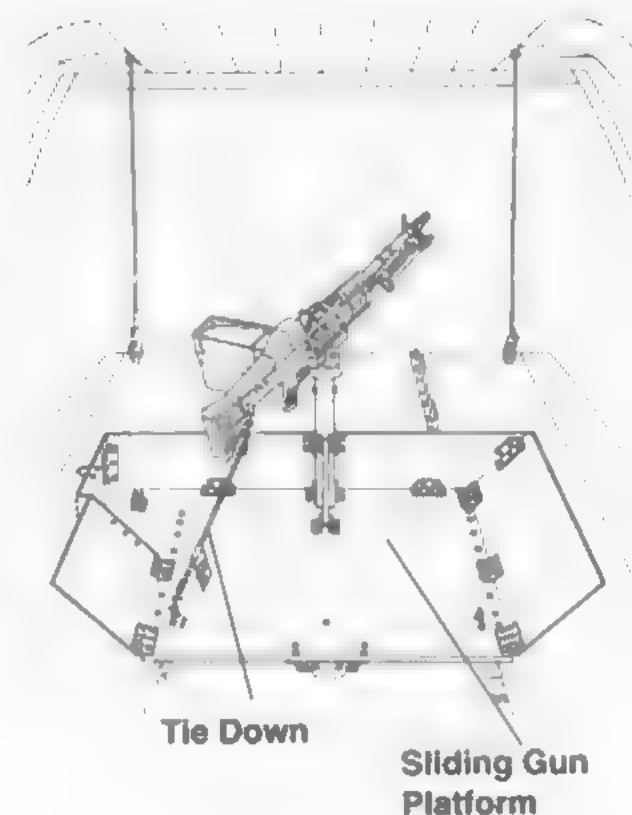
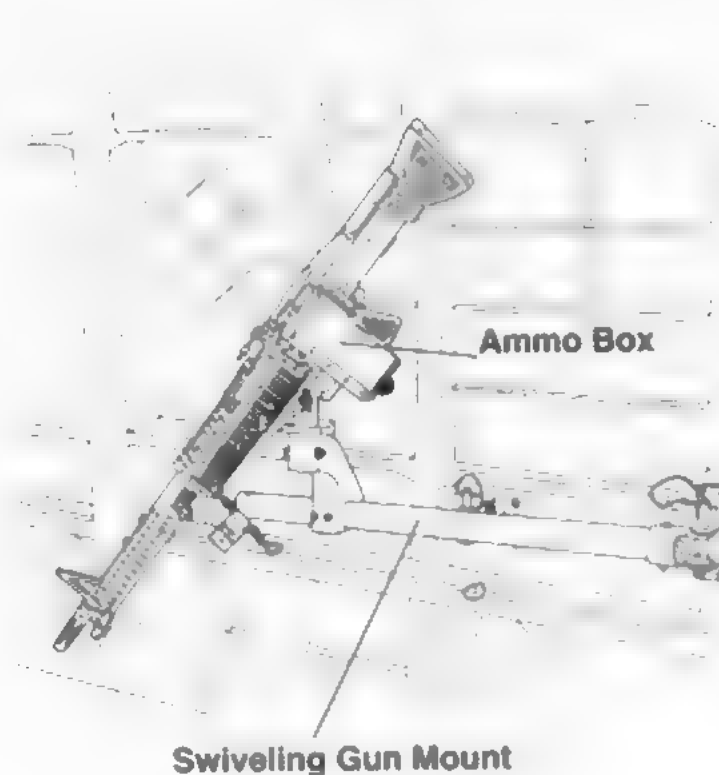


This HH-3E was one of two that made the first non-stop Atlantic crossing by helicopters. The aircraft made the crossing in just under thirty-one hours and were refueled in flight by HC-130s. This HH-3E (65-12785) later took part in the Son Tay raid in North Vietnam. The number, H211, was assigned by officials at the Paris Air Show. (USAF via Art Napolitano)

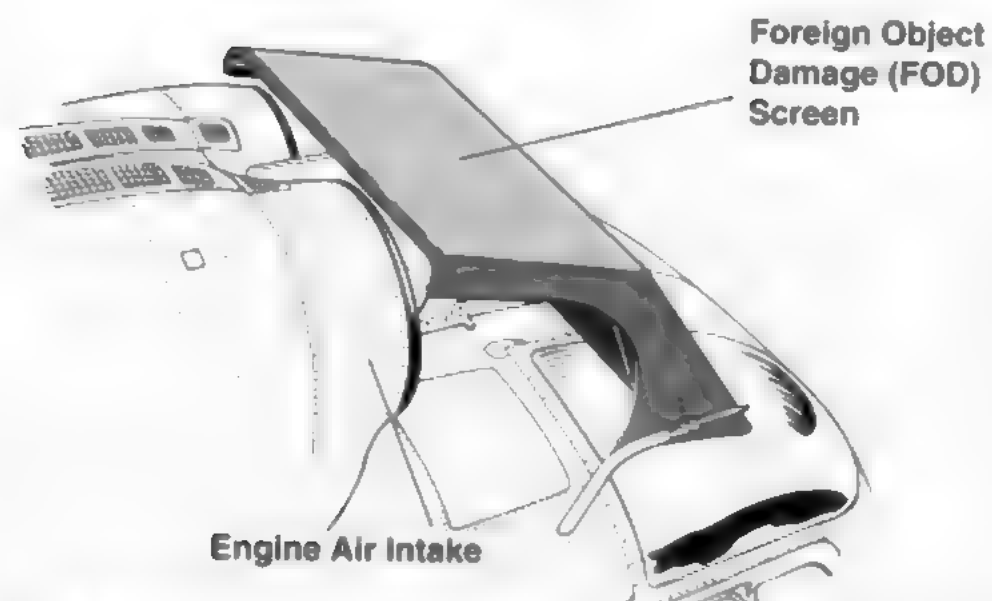
## Armament

Window Mounted M60 (Both Sides)

Ramp Mounted M60



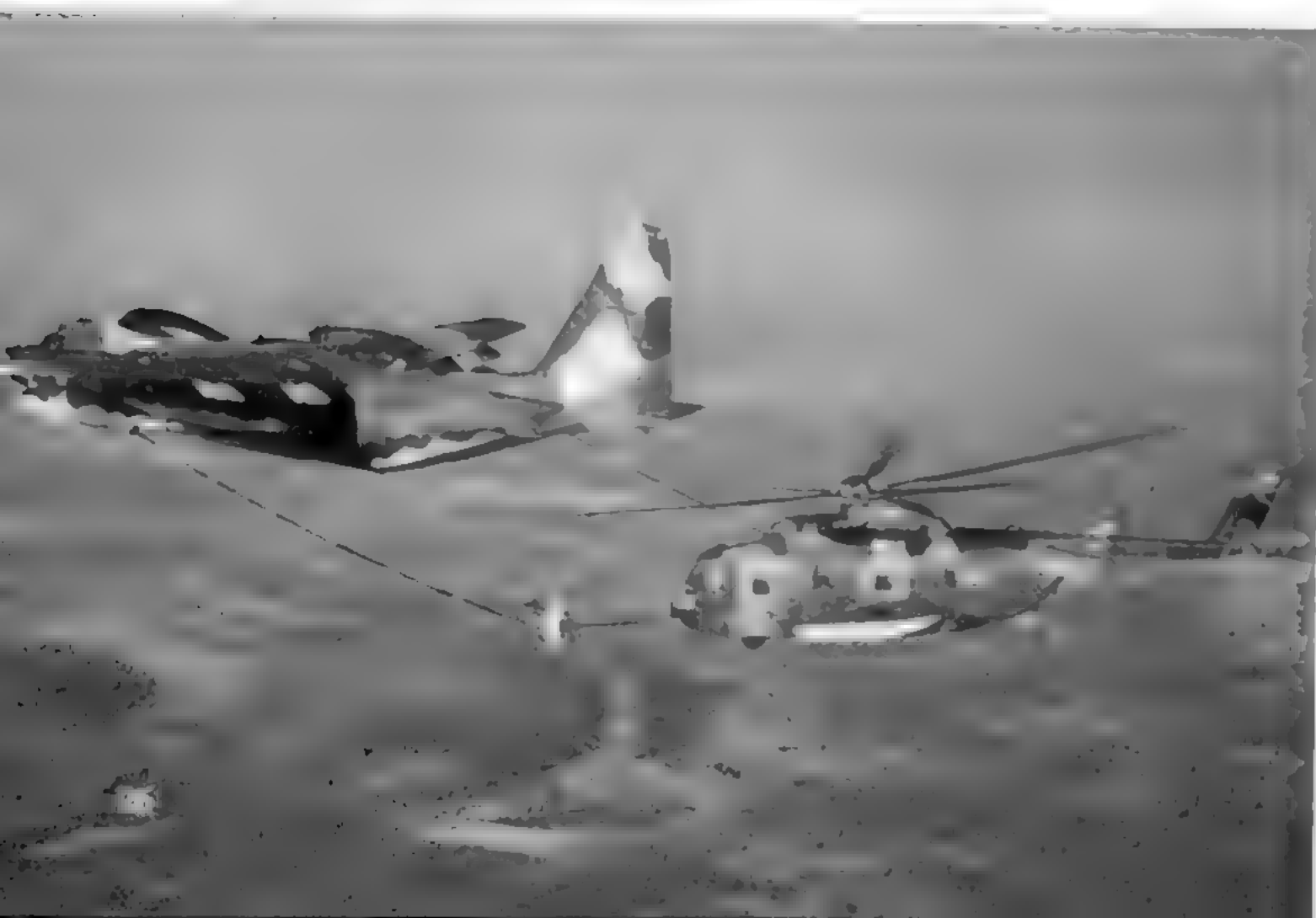
## FOD Screen



Additionally, certain HH-3E models were modified to carry the TAT-102B 7.62 Minigun turret, one mounted on each pylon. The guns were aimed from stations in the forward fuselage, usually utilized by the machine gunners. The Miniguns were provided with 8,000 rounds of ammunition and had a rate of fire of 4,000 or 1,300 rounds per minute.

There were three methods employed to rescue downed airmen using the HH-3E, although only two were used operationally in Southeast Asia. The first method was to land near the downed airman and simply have him climb onboard, the second method was by using the forest penetrator attached to the high speed rescue hoist which was equipped with 240 feet of

A HC-130P out of Chu Lai, South Vietnam refuels a HH-3E (67-14707) of the 37th ARRS based at Danang Air Base, over Laos. The 37th ARRS began operations from Danang during 1966, covering the northern sections of South Vietnam and Laos, as well as areas of Cambodia and North Vietnam. (Major E.E. Hatch, USAF)



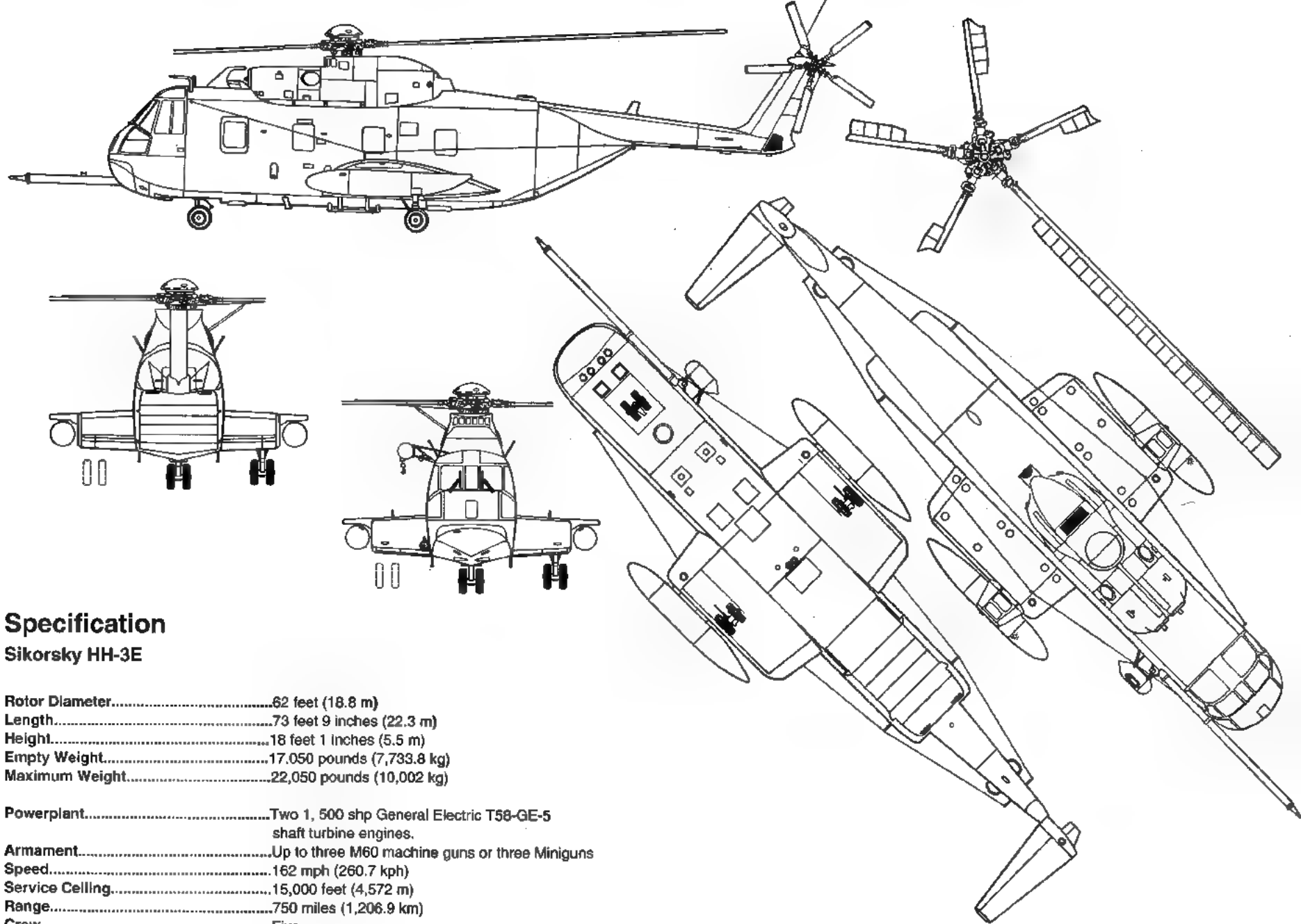
This HH-3E (66-13278) sits in Danang harbor, not a victim of enemy action, but of a failed cable on a Army crane. The aircraft was the first production HH-3E and was a total write-off after this accident. (Major E.E. Hatch, USAF)

cable. The penetrator was lowered through the dense forest canopy and the pilot would fold down the arms of the penetrator and climb on it. If the pilot was injured a para-jumper would ride the penetrator down and assist in the rescue. The third method was to employ the MARS system that was used so successfully to recover drones. In the MARS rescue a downed airman would release a helium filled balloon attached to a cable and harness. The HH-3E would fly over and snag the cable and reel in the pilot. The system was used to extract various agents

This HH-3E (65-12782) was a CH-3C converted to HH-3E standards for service in Vietnam. The aircraft has the refueling probe fully extended to take on fuel from a HC-130 tanker. This HH-3E is fitted with the FOD screen in front of the engine air intakes. (Sikorsky)







## Specification

### Sikorsky HH-3E

Rotor Diameter.....	62 feet (18.8 m)
Length.....	73 feet 9 inches (22.3 m)
Height.....	18 feet 1 inches (5.5 m)
Empty Weight.....	17,050 pounds (7,733.8 kg)
Maximum Weight.....	22,050 pounds (10,002 kg)
Powerplant.....	Two 1, 500 shp General Electric T58-GE-5 shaft turbine engines.
Armament.....	Up to three M60 machine guns or three Miniguns
Speed.....	162 mph (260.7 kph)
Service Ceiling.....	15,000 feet (4,572 m)
Range.....	750 miles (1,206.9 km)
Crew.....	Five



Hovering low over the Gulf of Tonkin, a HH-3E of the 37th ARRS picks up a downed pilot. The rescue hoist had some 240 feet of cable and was capable of lifting 800 pounds. This aircraft was armed with three M60 machine guns. (USAF via Art Napolitano)

The USAF bailed this CH-3E to the Navy for use at NAS Point Mugu, California in recovering drones and missiles from the Pacific. The aircraft was finished in overall Gloss Engine Gray with White markings. (Dave Menard)



A HH-3E (67-14722) lands at Clark Air Base, the Philippines during 1971. The HH-3E was a conversion of the earlier CH-3C modified to meet the demands of rescue work in Southeast Asia. This particular HH-3E is configured for external sling loads. (Tom Hansen via Wayne Mutza)

from the Cambodia and Laos operating areas.

The HH-3Es were named Jolly Green Giants due to their color scheme of two tone Green and Tan camouflage, and because they looked like the cartoon character of the same name that sold green canned vegetables. The HH-3E was the first production helicopter to be able to air-to-air refuel. The refueling probe was attached to the right side of the forward fuselage and the probe would extend out ten feet to provide adequate clearance for the drogue and the rotor blades. The British-developed probe and drogue system was utilized because the USAF flying boom type system could not be utilized with a helicopter. The HH-3E were normally refueled by a HC-130 aircraft since the refueling pods were mounted on the outboard wing positions providing adequate clearance.

The HH-3E had a total fuel capacity of 640 gallon in three under-floor self-sealing fuel tanks and 400 gallons in the two external fuel tanks, giving it an unrefueled range of over 800 miles.

The HH-3E was also fitted with the Hover In-flight and Refuel (HIFR) system, this concept had been used with success by the earlier HH-3A Navy SAR helicopters in Southeast Asia.

With air-to air refueling, range was limited only to crew endurance. This long range ability was demonstrated by a pair of HH-3Es when they flew from New York to Paris non-stop. The flight began on 31 May 1967 and 31 hours later on 1 June, the HH-3E's landed in Paris, France. The 4,271 mile flight established helicopter world records for range, speed and endurance. Refueled in flight nine times, the flight was made to commemorate the New York to Paris flight of Charles Lindbergh some forty years earlier. Ironically, one of the two HH-3Es that participated in the record flight (serial 65-12785) was the only HH-3E to be used in the Son Tay prison raid, some three years later. Further adding to the irony, the HH-3E had

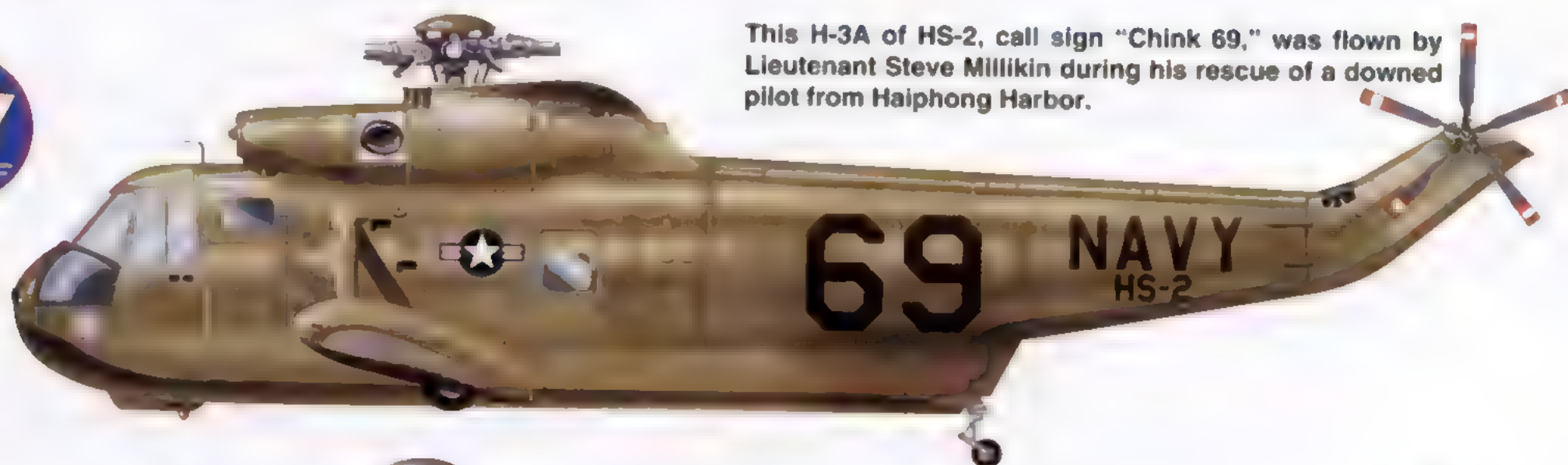




The XHSS-2 Sea King prototype was the first turbine engined helicopter accepted by the U.S. Navy.



HS-2



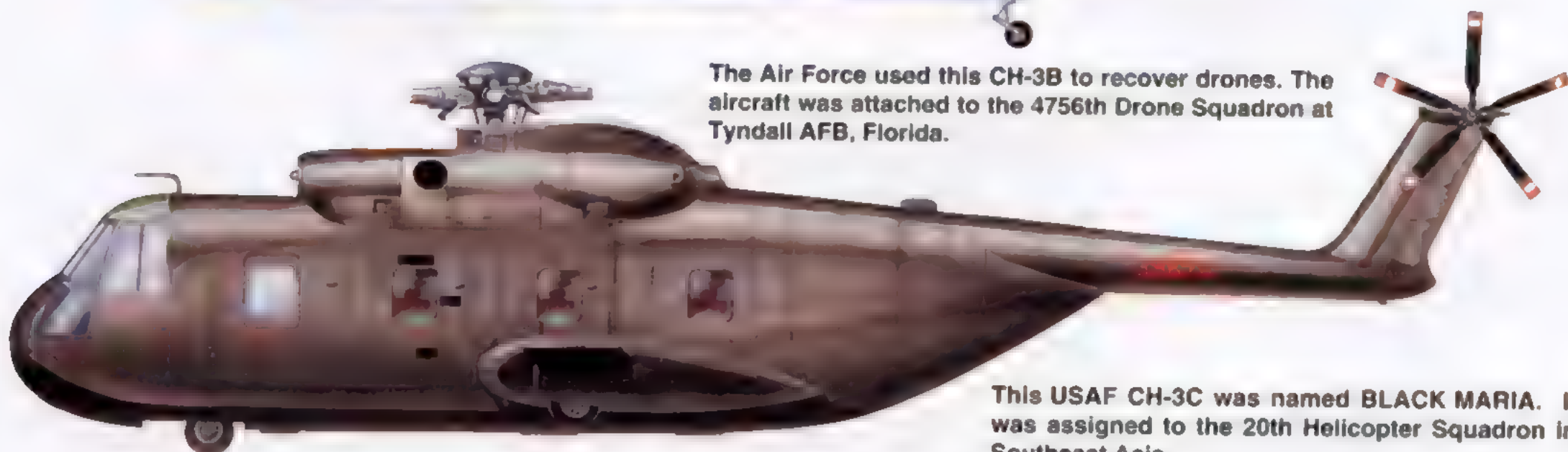
This H-3A of HS-2, call sign "Chink 69," was flown by Lieutenant Steve Millikin during his rescue of a downed pilot from Haiphong Harbor.



This Canadian Forces CH-124A Sea King of No 423 Squadron took part in Operation FRICTION during the Gulf War.

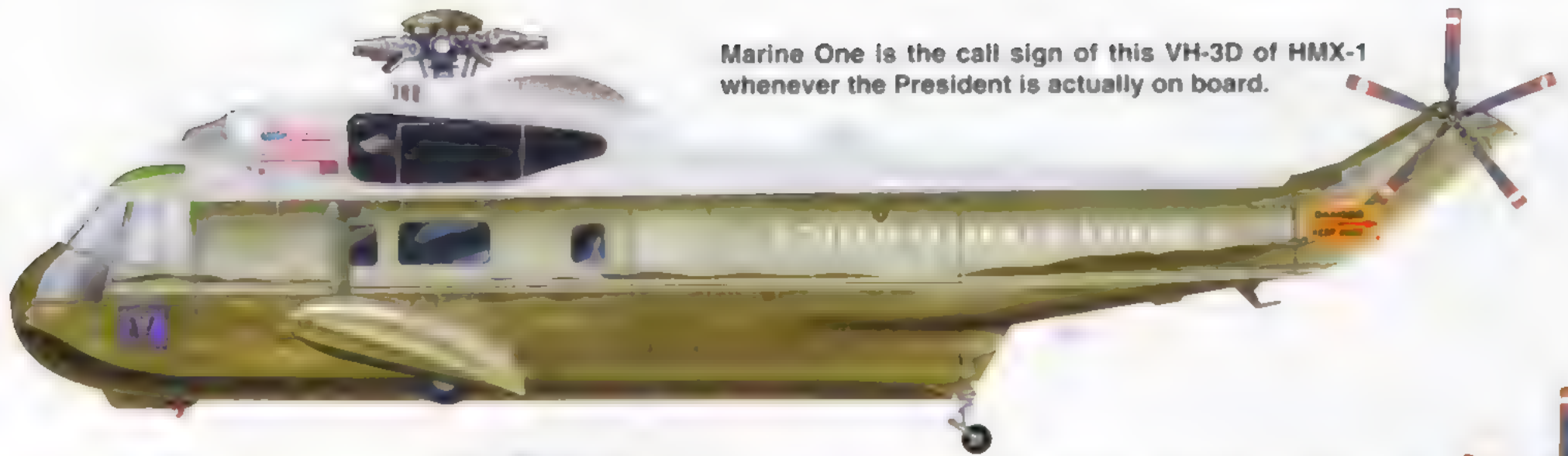


The Air Force used this CH-3B to recover drones. The aircraft was attached to the 4756th Drone Squadron at Tyndall AFB, Florida.

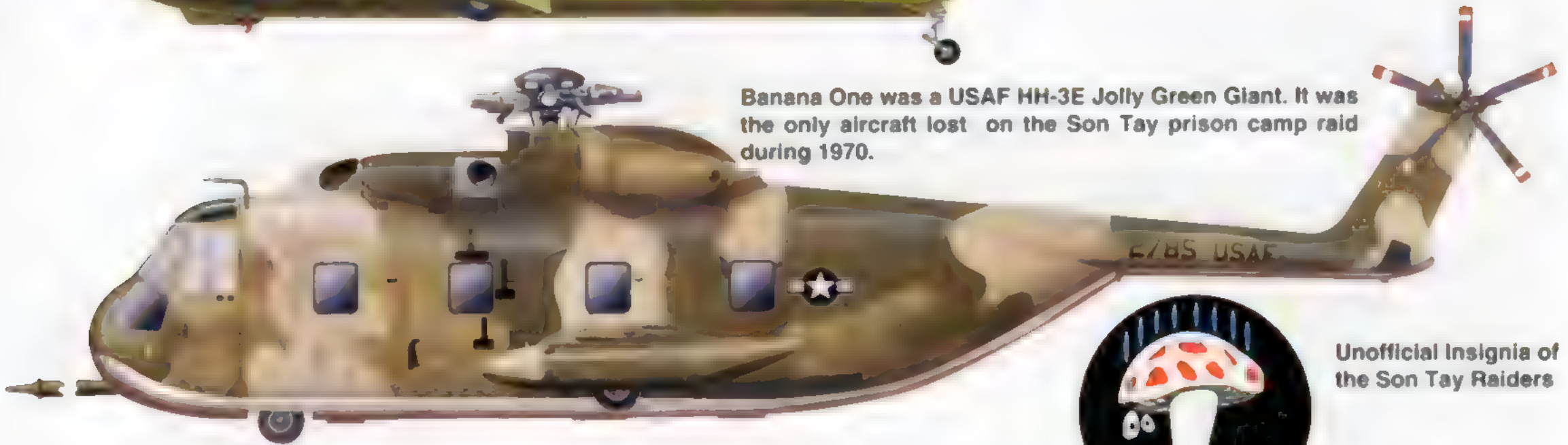


This USAF CH-3C was named BLACK MARIA. It was assigned to the 20th Helicopter Squadron in Southeast Asia.





Marine One is the call sign of this VH-3D of HMX-1 whenever the President is actually on board.



Banana One was a USAF HH-3E Jolly Green Giant. It was the only aircraft lost on the Son Tay prison camp raid during 1970.



Unofficial Insignia of the Son Tay Raiders



The Navy used this CH-3E at NAS Point Mugu, California in the utility role.



DESSERT DUCK was a SH-3G Sea King of HC-2 Circuit Riders. The aircraft was based out of Manama Airport, Bahrain during Operation DESERT STORM.



Naval Air Station Jacksonville, Florida uses this SH-3H in the search and rescue role.



A CH-3E from Tyndall Air Force Base recovers a Beechcraft MQM-107B drone from the Gulf of Mexico firing range. Tyndall operates as a training base for F-15 pilots as well as being charged with air defense for the southern United States. (USAF)

A CH-3E of the 1st Helicopter Squadron, 89th Military Airlift Wing, at Andrews AFB, Maryland taxis out to the active runway. The aircraft was White over Light Gray with a Red/White/Blue cheat line. This aircraft was one of nine that were transferred to the USCG and rebuilt to HH-3F standards. (USAF)



This HH-3E was assigned to the 55th ARRS at Kadena Air Base, Okinawa, Japan during 1982. The aircraft carries the "Lizard" wrap around camouflage of Gray, Green and Dark Green which was first introduced during 1982. (USAF)

the same command pilot, Major Herbert Zehnder.

The Son Tay raid took place on 20-21 November 1970 and was an attempt by the USAF and U.S. Army to rescue captured airmen that were being held at the prison camp just west of Hanoi, North Vietnam. The HH-3E, call sign Banana One and flown by Lieutenant Colonel Herbert E. Zehnder and Major Herbert Kalen, was purposely crashed on to the Son Tay compound to act as a firebase and a safe haven for the POW's. Unfortunately all of the prisoners had been moved to a more secure prison and the rescue attempt failed.

There were thirteen new production HH-3Es, serials 66-13278 through 13290 and 68-8282. The first six HH-3s were destroyed in Southeast Asia. Twenty-six CH-3C and thirty-seven CH-3E were converted to HH-3E standards.

The first CH-3E, serial number 66-13291 was bailed to the U.S. Navy and used by NAS Point Mugu, California to retrieve drones and missiles in the Pacific Ocean. The Navy CH-3E was finished in an overall Engine Gray scheme with White lettering.

The CH and HH-3E are still in USAF, USAF Reserve and Air National Guard service. One unit, the 41st ARS (Air Rescue Service) at Patrick AFB, Florida is charged with Shuttle astronaut recovery. The H-3s of the 41st go by call sign Jolly followed by the last two digits of the serial number. There are of course exceptions to that, in the case of 69-05811 goes by Jolly 70.

The 71st SOS (Special Operations Squadron) Air Force Reserve at Davis-Monthan AFB, Arizona was the only HH-3E unit to see service in DESERT SHIELD/STORM. Stationed at King Fahd AFB, Saudi Arabia, they were charged with rescuing downed allied airmen. Five HH-3E were deployed, (serials 67-14703, 14707, 14718, 14724 and 69-05798), all were painted in a Desert Sand and Brown photo-reflective camouflage scheme that had been laid out by the 1st SOW (Special Operations Wing) at Eglin AFB, Florida.





**A HH-3E undergoes preflight inspection by its aircrew at Hill Air Force Base, Utah. The aircraft was assigned to the 129th Air Rescue Group, California Air National Guard, NAS Moffett Field, California. It was finished in overall Gloss Medium Gray with a Black and Yellow tail band. (Terry Love)**

In 1985, an operational test and evaluation was made using a HH-3E from the 71st SOS. Owing to the success and effectiveness of the Soviet Mi-8 gunship, the HH-3E was fitted with 2.75 inch folding fin rocket pods and firing tests were undertaken at the Goldwater North tactical range, Gila Bend, Arizona. The firing tests were successful, but no value was seen by the USAF for an attack/gunship since the U.S. Army's AH-64 Apache would perform the same duties with a much more survivable airframe.

Beginning in 1991, CH/HH-3Es that were considered surplus to USAF, USAF reserve and Air National Guard units were being flown to Fort Rucker, Alabama to be stripped of all non-essential flight equipment, including the refueling booms on the HH-3E models and converted into drones. The conversions were to have taken place at Cairns Army Airfield located just south of the main base at Fort Rucker. Once the drone program becomes fully operational, the QCH-3E were to be used to sharpen the aerial gunnery skills of the OH-58D Kiowa Warrior and the AH-64 Apache pilots and gunners, but due to a lack of funds, the entire project was canceled.

In 1989, the USAF began the transfer of ten CH-3E to the U.S. Coast Guard for conversion to HH-3F standards and also to provide spares for the existing HH-3F fleet. Five of the CH-3E were converted to HH-3F standards with the addition of an auxiliary fuselage mounted fuel tank as carried by the HH-3E model, LORAN "C" navigation system, and an APN-215 radar system in the nose. The balance of the CH-3Es were used for spares and instructional purposes. The conversions took place at the Aircraft Repair and Supply Center (ARSC), Elizabeth City, North Carolina. Coast Guard Air Station Traverse City, Michigan operated three of the newly converted HH-3Fs and Elizabeth City, North Carolina operated two. The HH-3Fs will



**Crewmen depart this HH-3E of the 106th ARS at Suffolk County Air National Guard Base, New York. The HH-3E was replaced in National Guard service by MH-60G Pave Hawk helicopters during the early 1990s. (Terry Love)**

eventually be replaced in USCG service by the HH-60 Jayhawk.

All USAF CH/HH-3Es will eventually be replaced by the MH/HH-60G Pave Hawk for the SAR and Special Operations roles. The H-3Es will have served for over thirty years, with some aircraft accumulating over 8,500 hours on the airframe.

**An aircrewman stands in the door of this HH-3E of the 129th AARS Jolly Greens from NAS Moffett Field, California. The aircraft is in the wraparound "Lizard" camouflage. (via Michael R. Hursh)**





A CH-3E is directed in for landing aboard the ammunition ship, USS MOUNT HOOD (AE-2) during 1981. The MOUNT HOOD was assisting in salvage operations of the capsized Philippine destroyer DATU KALANTIAW (ex-USS BOOTH DE-170). (Navy)



This CH-3E was fitted with the fixed landing gear from a civilian S-61L at Elmendorf Air Force Base, Alaska. The aircraft was used to resupply the early warning radar sites that are scattered throughout the Alaskan countryside. (Terry Love)

This "Lizard" camouflaged HH-3E served with the 302nd Special Operations Squadron. While serving with the 20th Helicopter Squadron in South Vietnam, this aircraft was finished in an overall Black scheme that earned it the nickname Black Maria. (Terry Love)





A CH-3E of the 41st Air Rescue and Recovery Squadron, Patrick AFB, Florida ■ prepared for flight by its crew. The 41st is responsible for the recovery of Shuttle crews in the event of an emergency. (via Captain John Coffindaffer, USAF)

A HH-3E of the 71st Special Operations Squadron, Davis-Monthan AFB, Arizona fires a volley of 2.75 inch rockets during tests at the Goldwater North tactical range at Gila Bend. Although successful, it was decided not to arm the HH-3Es with rockets. (Major Michael G. Shook, USAF)



Upon retirement, this CH-3E was repainted in its Vietnam overall Black color scheme and put on display at the Air Force Museum. *Black Maria* served with the 20th Helicopter Squadron during Operation Pony Express. (Dave Menard)



An HH-3E of the 71st SOS taxis along the ramp at King Faisal Royal Saudi Air Force Base during Operation DESERT STORM. The 71st was the only operator of the HH-3 during the war and camouflaged their aircraft in a desert scheme of Sand and Brown. (USAF)

An aircrewman repels from a HH-3E of the 71st SOS during Operation DESERT SHIELD. The aircraft was camouflaged in a Sand and Brown desert scheme for its role in rescuing allied aircrews. (USAF)





# HH-3F Pelican

In 1962, the U.S. Coast Guard ordered four of the Sikorsky HH-52A helicopters for the Search and Rescue (SAR) role. The HH-52A was Sikorsky's model S-62 and eventually the USCG procured a total of ninety-nine HH-52A. The HH-52 was basically a mini S-61 (H-3), with a single turboshaft engine and a slightly shorter fuselage with reduced range.

During 1968, the USCG, recognizing the need for a longer range SAR helicopter, contracted with Sikorsky for the production of nine S-61R models under the designation HH-3F, the first production models were serialized 1430 through 1438. Soon after production began, the USCG announced that their new HH-3F helicopter would be called the Pelican. The prototype HH-3F (1430) was sent to U.S. Coast Guard Air Station New Orleans on 20 January 1969 for operational tests, evaluation and training.

The HH-3F was the first twin engine helicopter for the USCG and the second one to be turbine powered, the HH-52A being the first. The HH-3F was essentially a HH-3E with all the armor and refueling probe removed. The HH-3F was powered by a pair of 1,500 shp General Electric T58-GE-5 engines.

Operational tests and USCG service proved the value of the HH-3F and in 1971 a further thirty-one more were ordered (serials 1467 through 1497). This brought the inventory up to a

**The first HH-F (1430) makes a water landing demonstrating the water borne method of rescue using the cargo door ramp. The preferred method of over-water rescue is using the hoist with a sling or rescue basket, since it presents less risk to the helicopter than a water landing. (Sikorsky)**



The prototype HH-3F (1430) during a test flight from the Sikorsky plant. The HH-3F was based on the HH-3E without armor, armament, self-sealing fuel tanks and in-flight refueling. The aircraft was also equipped with a nose mounted weather/search radar. (USCG)





**A HH-3F makes a pick up from a USCG 41 foot launch in Tampa Bay, Florida. Training is constant for USCG aviators and crewmen. The aircraft carries the name of its home station, Clearwater, on the sponson in Black. (USCG - Tom Gillespie)**

total of forty, the last HH-3F being delivered on 10 July 1973 from the Sikorsky factory in Stratford, Connecticut.

The HH-3F was the only H-3 U.S. armed forces model to be fitted with a nose mounted radar. The thimble nose radome was mounted on the port side nose section housing an APN-215 search and weather radar. The radar enables the HH-3F to operate in adverse weather conditions. Further enhancing operational capability is the LORAN "C" navigational system and the automatic flight control system that provides for automatic flight into a hover.

The HH-3F retained the fuselage length of the earlier HH-3E of 57 feet 3 inches, but range was reduced since the HH-3F did not retain the external fuel tanks. Internal fuel remained at 642 gallons, unlike the HH-3E these tanks were not self-sealing since this feature was not required. The HH-3F had a maximum takeoff weight of 22,050 pounds and can accommodate up to twenty-five passengers/survivors, fifteen liter patients or 5,000 pounds of internal cargo. An external cargo sling load of up to 9,000 pounds can also be carried. Maximum speed is restricted to 165 mph.

Rescue by the HH-3F can be accomplished in many different ways. By using the 800 pound capacity hoist that is located on the starboard fuselage upper side, a rescue basket, stokes litter or sling can be lowered to effect a rescue. Using the aircraft's amphibian capability, the HH-3F pilot can land on the water and fold out the rescue platform from the starboard cargo door so that a rescue can be made by the cabin crew.

The standard crew complement of a USCG HH-3F consists of the command pilot, co-pilot, flight mechanic, avionicsman, and a rescue swimmer, who is qualified as an emergency medical technician.

Agusta of Italy license produced a total of thirty-four aircraft under the designation AS-61R (HH-3F) for the Italian Air Force for use in the SAR role by the 15<sup>o</sup> Stormo. The Italians, like the USCG, have painted their AS-61Rs in an overall White scheme. The Italians though have used Yellow identification bands and Orange panels where the USCG have used International Orange bands and panels. The Italian AS-61R retains the nose mounted weather radar that is an identification feature of the HH-3F/AS-61R.



**A rescue swimmer jumps from a HH-3F (1486) into the cold waters off Alaska. This HH-3F is stationed at USCG Station Sitka, Alaska. The normal crew for a HH-3F is: pilot, co-pilot, crew chief, and rescue swimmer (also a qualified paramedic). (USCG)**

Sikorsky also produced a pair of HH-3Fs for use by the Argentine Air Force in the SAR role along their long Atlantic Coast.

In 1989, the USCG began the conversion of five ex-USAF CH-3Es to HH-3F standards. The conversions were undertaken by the ATSC Elizabeth City, North Carolina as replacements for some of the aging HH-3Fs until the newer HH-60J Jayhawk could be introduced into service. A further five were acquired by the USCG for use as spares and to be used in the instructional role.

The HH-3F will eventually be replaced by the newer Sikorsky HH-60J Jayhawk. The HH-60J, with external fuel tanks, will have an increased range over the HH-3F, but will not be able to accommodate as many survivors. By 1993, the USCG hopes to have procured enough HH-60Js to completely replace their aging HH-3Fs.

## Radome

### CH-3E



### HH-3F



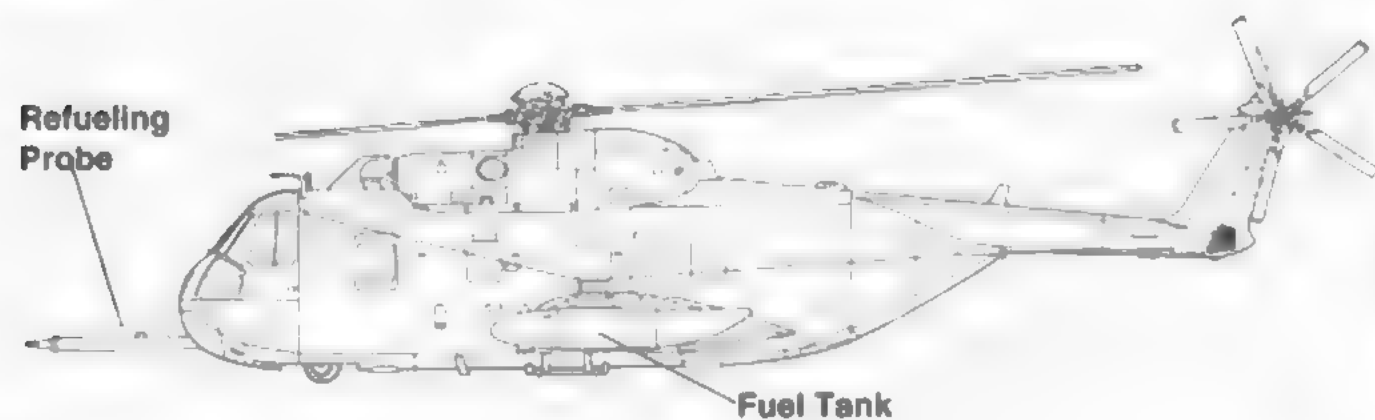
**APN-315  
Search  
Radar**



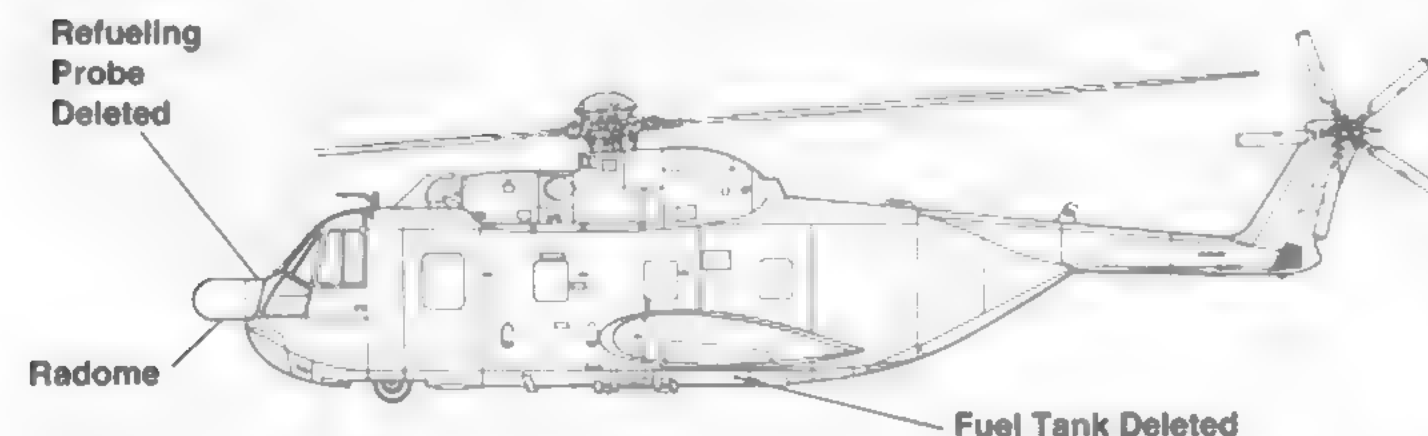
A HH-3F (1479) from Sitka flies over the ALASKAN MONARCH to check to see if there are any crewmen still aboard the ice bound ship. The HH-3F has a range of over 500 miles. The Orange nose and fuselage bands are very useful under Alaskan conditions. (USCG)

## Fuselage Development

### HH-3E



### HH-3F



The flight crew of this HH-3F prepare for flight on the ramp at USCG Air Station New Orleans, Louisiana. Coast Guard crews are always on alert status. (USCG)

A HH-3F conducts a Hover In Flight and Refuel (HFIR) operation over the USCG Cutter VENTUROS (WMEC 625). By the use of the HFIR technique, the range of the HH-3F is limited to available ships and crew endurance. This HH-3F was stationed at USCG Air Station San Diego, California. (USCG)







A victim is recovered using a rescue basket suspended from the rescue hoist of this HH-3F from USCG Air Station San Francisco, California. The San Francisco Bay area is a hazardous operating area due to the quick moving fog and changing winds that frequent the area. (USCG)

A HH-3F from New Orleans attempts to rescue a crewman from the trawler MANAMA in the Gulf of Mexico. The Coast Guard regularly rescue crew members from boats along both U.S. coasts, regardless of nationality. (USCG)



The cabin crewman guides the rescue basket on this HH-3F from USCG Air Station Brooklyn, New York. The HH-3F can carry up to twenty-six survivors on a single rescue mission. Additionally, the aircraft can carry up to 5,000 pounds of internal cargo or a sling load of up to 8,000 pounds. (USCG)

A HH-3F (1430) is parked on the ramp of USCG Air Station Clearwater, Florida ready for instant take off in the event of a rescue mission. Clearwater is responsible for a large portion of the Gulf of Mexico for both rescue and law enforcement missions. (USCG)



# SH-3G

In 1971, the U.S. Navy began the conversion of eleven SH-3A and SH-3D airframes into utility versions of the Sea King under the designation SH-3G. Eventually 105 of the earlier models were converted to SH-3G standards. The conversions and upgrades included the removal of all ASW gear and provisions to install 175 gallon external fuel tanks on the lower sponson supports. The SH-3G was also fitted with an improved refueling system that would enable it to Hover In-Flight and Refuel (HIFR). Using this system, the SH-3G could hover over a ship and, using the rescue hoist cable, hoist the refueling hose aboard and accomplish the fueling process.

A SH-3G of Helicopter Combat Support Squadron One (HC-1) is craned aboard ship. HC-1, known as the Fleet Angels, was established as HU-1 in 1948 and redesignated as HC-1 in 1965. HC-1 Detachment Three (Det 3) was stationed aboard USS TARAWA during Operation DESERT STORM. (Navy)



A SH-3G (BuNo 150620) of HC-1 prepares to HIFR from the USS BAGLEY (FF-1069) in the Pacific during 1981. The Sea King is equipped with 175 gallon external fuel tanks. (Navy)

Further conversions and improvements included the strengthening and reinforcement of the load floor area to handle heavy cargo. The reinforced floor could also be fitted with a gun mount for a M-60 7.62MM machine gun. Six early SH-3Gs were fitted with the 7.62MM Minigun, similar to the HH-3A, but these were later deleted in favor of the M-60 mount. The SH-3G was powered by the same General Electric T-58-GE-10 engines that powered the SH-3D and all SH-3Gs were fitted with smaller non-ASW sponsons since they would not be used in the ASW role.

The first SH-3Gs were assigned to Helicopter Combat Support Squadron One (HC-1) Fleet Angels, Detachment One, stationed aboard USS RANGER (CV-61). By 1973, HC-1 would have detachments serving onboard USS MIDWAY (CVA-41), USS ORISKANY (CVA-34), USS CORAL SEA (CVA-43) and USS HANCOCK (CVA-19). Twenty SH-3Gs were assigned to HC-2 Circuit Riders at NAS Lakehurst, New Jersey and detachments were stationed aboard USS JOHN F. KENNEDY (CV-67), USS FRANKLIN D. ROOSEVELT (CVA-42) and USS AMERICA (CVA-66). The SH-3Gs were used in the utility role performing ship to shore transport of personnel and equipment and plane guard duties.

In January of 1972, Helicopter Anti-submarine Squadron Fifteen (HS-15) Red Lions was deployed aboard the USS GUAM (LPH-9) to evaluate the SH-3G in the Sea Control Ship concept. HS-15 had been formed in 1971 to evaluate and train supply detachments for Sea



A formation of five SH-3Gs and one CH-53E of HC-1 fly over the Pacific near NAS Miramar, California. HC-1 provides utility and transport services to units of the Pacific fleet. (Navy)

Control Ships (SCS) using the SH-3G.

The SH-3G would go on to serve with HC-1 and HC-2 as well as Fleet Composite Squadron Five and Eight (VC-5 and VC-8). They operated in the utility role recovering Firebee drones, such as the BQM-34 and BQM-74 in the Atlantic and Pacific. VC-6 Skeet of the Fleet operated off of USS MISSOURI (BB-63) and USS WISCONSIN (BB-64) providing "eyes" for the big 16 inch guns, with small TV guided Pioneer drones over Kuwait.

HS-10 Taskmasters, the Pacific Fleet Replacement And Training (RAG) Squadron strike rescue detachment operates a few SH-3Gs at NAS Fallon, Nevada for SAR training. HS-10's SH-3Gs are painted an overall Dark Green in contrast to the usual scheme of Gloss White over Gray worn by most utility squadron detachments.

HC-2 Detachment 2 was assigned to the Allied forces during Operation DESERT SHIELD/STORM and were stationed at Manama International Airport, Bahrain. HC-2 was no stranger to the area having been stationed in Bahrain since 1972. All of HC-2 Det 2 aircraft were painted in an overall Medium Gull Gray and were named Ducks of one sort or another. There was Desert Duck, Stealth Duck, Wild Duck, and Dusty Duck. The names were usually painted on the starboard sponson. HC-2 Detachment 1 also operates a SH-3G out of Naples, Italy that is painted overall Engine Gray and designated as Ghost Rider 741. It is used to transport the Commander of the Sixth Fleet. 741 is unusual in that it has an enlarged window in the starboard cargo door.

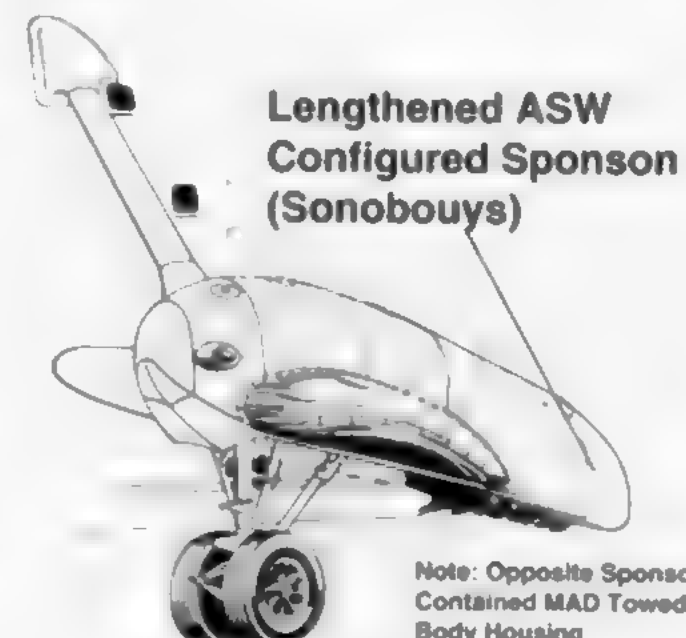
The SH-3G will continue to be operated by active U.S. Navy squadrons until they are replaced by the Sikorsky utility version of the SH-60 Sea Hawk.



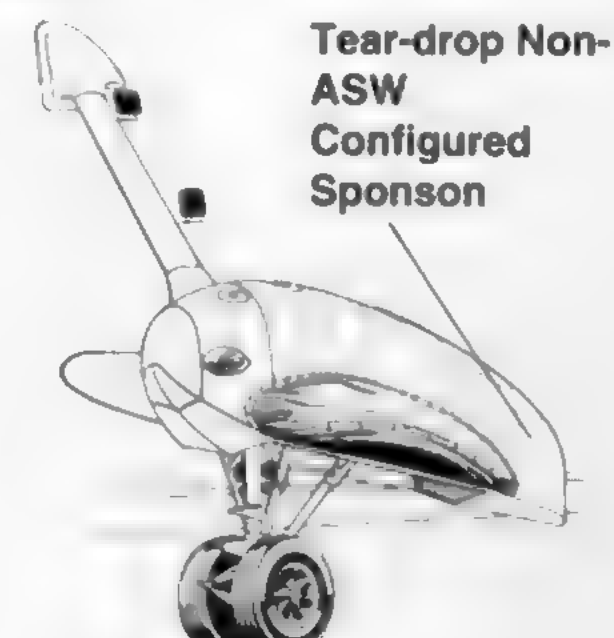
A SH-3G (BuNo 149679) of HC-1 lifts a Mk 2 Mod 0 torpedo recovery cage at NAS North Island, San Diego, California during 1991. UP 723 is fitted with an auxiliary antenna on the rear fuselage to aid in locating the training torpedoes for recovery. (Donn Keels via Stu Jones)

## Sponson Development

### SH-3D



### SH-3G



Note: Opposite Sponson Contained MAD Towed Body Housing





A SH-3G (BuNo 149731) of Helicopter Combat Support Squadron Two (HC-2) flies over the Persian Gulf during 1992. HU 740 carries the name DESERT DUCK on the sponson in Black. HC-2 has had a detachment in Bahrain since 1972. (Navy)

A SH-3G (BuNo 149737) lands at NAS Norfolk, Virginia with a Mk 48 training torpedo in the recovery cage. HC-2 supports the Atlantic fleet in the utility and transportation roles. (Stu Jones)



A ground crewman holds the wheel chocks for this SH-3G (BuNo 149773) of HC-2 as it lands at NAS Norfolk, Virginia during 1991. The aircraft carries the squadron insignia on the ice/FOD deflector in front of the engine air intakes. (Stu Jones)

A SH-3G (BuNo 149737) makes an approach for landing aboard a combat support ship. Aircraft from HC-2 Home Detachment are finished in the standard Gloss White over Gray colors. The crewmen in the open door are relaying altitude information to the pilot as they approach the ship. (Navy)





These crewmen have just completed refueling their SH-3G and are moving the hard hose back out of the way prior to take off from NAS Norfolk, Virginia during 1991. (Stu Jones)

This SH-3G of HC-2 rests on the ramp at Bahrain with its main rotors folded back. HU 720 was one of the few HC-2 Sea Kings that did not receive an official squadron Duck name. (Stu Jones)



HU 722, a SH-3G of HC-2 parked on the ramp at Bahrain during 1991. During Operation DESERT STORM, the aircraft was kept on alert with external fuel tanks for SAR missions. The Sea King was finished in overall Medium Gull Gray with Dark Gray lettering. (Stu Jones)

STEALTH DUCK ■ guided into position to HIFR from USS ENGLAND (CG-22) in the northern Arabian (Persian) Gulf by a director during Operation DESERT SHIELD/STORM. The Gulf is known by two names, to the Saudis it is the Arabian Gulf, to the Iranians, it is the Persian Gulf. The aircraft carries the aircraft number on the nose in Arabic numerals. The legend on the ice/FOD shield is CJTFME/CMEF (Commander Joint Task Force Middle East/Commander Middle East Forces). (HC-2/Navy)





A SH-3G sets on the ramp at Bahrain with the engine panels open. These panels also serve as work stands for maintenance personnel. The aircraft is in the process of having its individual aircraft number changed and has the last two digits painted out. It was later number 741. (Stu Jones)

(Right) Ghost rider 741 prepares to HIFR from USS BELKNAP in June of 1992.. The aircrew uses the rescue hoist to raise the fuel hose into the aircraft. The aircraft carries the squadron insignia on the nose. (Stu Jones)

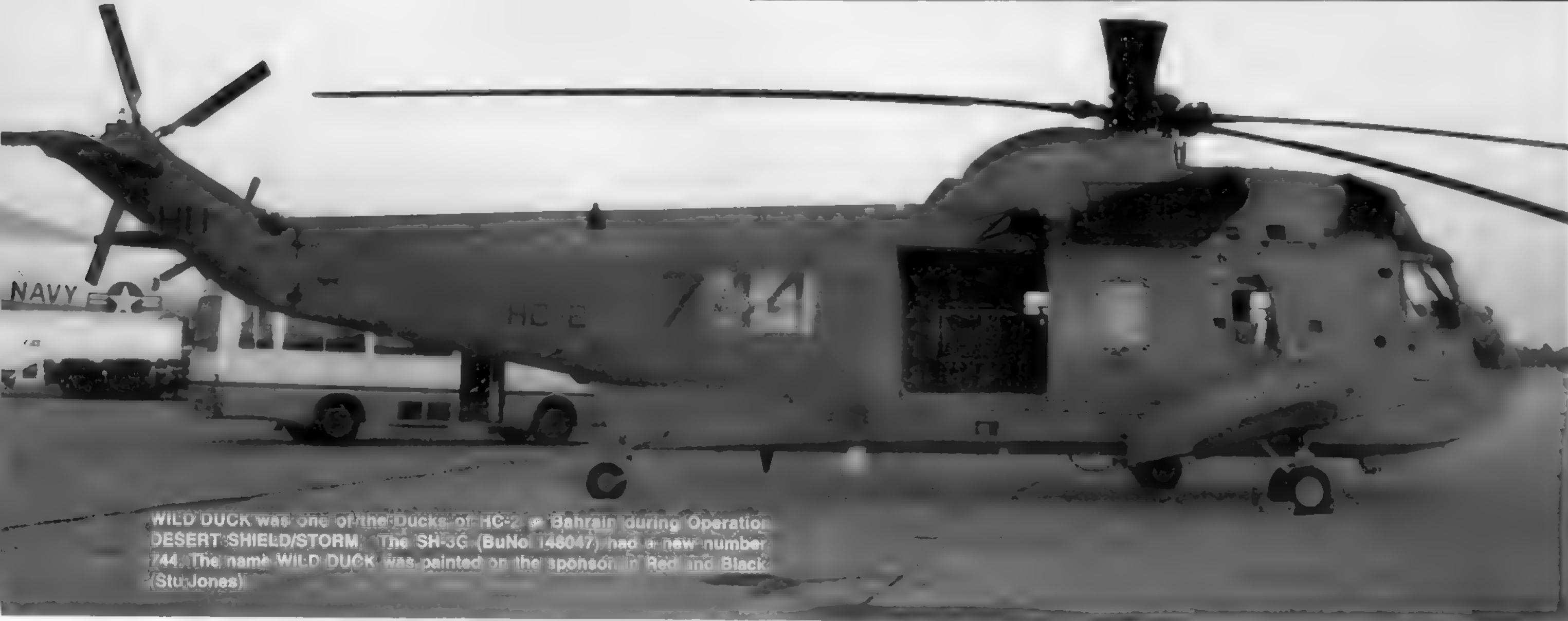
This SH-3G (BuNo 151527) is parked on the dirt ramp at Naval Air Facility, Naples, Italy during 1992. The aircraft is hooked up to an Italian power unit for preflighting. HC-2 keeps a detachment at Naples to support the Sixth Fleet. (Stu Jones)



Ghost rider 741 is tied down on the helo deck of USS BELKNAP (CG-26) during June of 1992. The aircraft serves with HC-2 Det One as the personal transport for the Commander of the Sixth Fleet (COMSIXTHFLT) in the Mediterranean Sea. The aircraft was modified with an enlarged window in the cargo door. (Stu Jones)



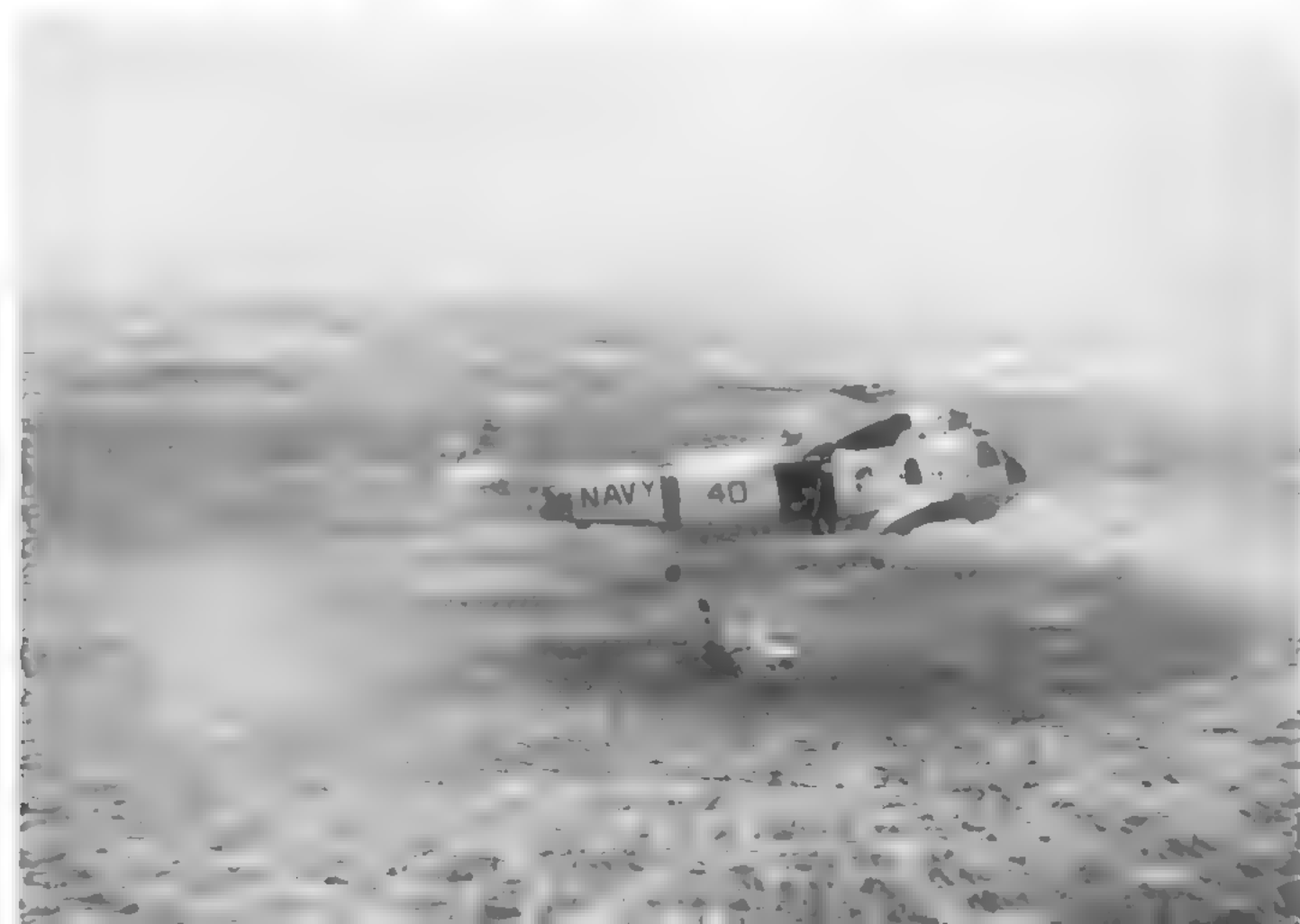




A SH-3G of HC-2 makes a landing approach to the helo deck of USS SIMPSON (FFG-56) operating in the Persian Gulf in late 1992. The aircraft had a sling load hook attached under the fuselage and has the aircraft number on the nose in Arabic. (LT Joe Overstreet)



A SH-3G of Fleet Composite Squadron Five Checkertails recovers a Ryan BQM-34-S Firebee drone from the waters off Cubi Point, The Philippines during 1981. The cabin crewmen are using the rescue hoist to snag the drone before attaching it to the under-fuselage sling load hook. (Navy)





A SH-3G of VC-8 flies near NAS Roosevelt Roads, Puerto Rico during 1983. The aircraft carries a Pacific Missile Test Center (PMTTC) blocking system antenna under the forward fuselage. The antenna is used for locating downed practice air-to-air missiles. (Navy)

Aviators from Helicopter Squadron Ten (HS-10) Strike Rescue at NAS Fallon, Nevada watch as a detachment pilot demonstrates the proper landing approach for a SAR mission. HS-10 operates as the Pacific coast RAG (training) squadron. The aircraft is camouflaged in an overall Dark Green color. (Navy)



This SH-3G is carrying a Ryan BQM-34A drone that it had just recovered from the Atlantic off Puerto Rico during 1981. VC-8 Redtails was originally designated as a guided missile service squadron before its present designation as a Fleet Composite Squadron. The squadron operates in the support role for Atlantic Fleet units operating in the Caribbean operating/training area. (David G. Campbell)

# SH-3H

In 1971, Sikorsky announced an improved version of the SH-3G for the U.S. Navy. Eleven SH-3Gs were initially returned to Sikorsky's Stratford, Connecticut facility for conversion to SH-3H standards.

The conversion included the addition of an ASW equipment suite similar to that carried on the SH-3D, including a AQS-81 MAD towed body fitted to the starboard sponson and dipping Sonar. Upgrades included Electronic Surveillance Equipment (ESM) to detect incoming missiles that might threaten the fleet and Canadian-Marconi LN56HP radar, which was installed under the fuselage. Smoke marker launchers were added to the port sponson and an external chaff/flare dispenser was fitted to the port aft fuselage side for airborne self-protection against ground/sea-to-air missiles.

With the success of the SH-3G to SH-3H conversion, the U.S. Navy began to convert earlier SH-3A and SH-3Ds to the newer SH-3H standards. Two USAF CH-3Bs were also bailed to the U.S. Navy and brought up to H model standards, they would go on to serve with HS-10. The first thirty-five aircraft were completed by 1976 and when the conversion program was finally terminated, a total of 163 SH-3s had been brought up to SH-3H standards. In 1976 the Canadian-Marconi sea search radar was eliminated and that area was used to install sonabouy launchers. The ESM equipment was also eliminated and replaced by an altitude heading reference system. A sonabouy/data link system antenna was fitted on the lower fuselage spine centerline to receive information from the sonabouys.

The SH-3H has an empty weight of 11,865 pounds and a maximum take off weight of 21,000 pounds. Maximum speed is rated at 136 mph and the aircraft has a service ceiling of 14,000 feet. Range is over 600 miles due to the addition of a third fuel cell in the fuselage, bringing total fuel capacity to 840 gallons. The SH-3H's that had been converted from the earlier SH-3G had the sponson supports plumbed for external fuel tanks, but the SH-3A and SH-3D conversions did not have this capability. The SH-3H is powered by a pair of 1,400 shp General Electric T58-GE-10 turboshaft engines. As a protection against ice build up on the engine intake area an ice shield/Foreign Object Deflector (FOD) was fitted in front of the engine air intakes. This device was also retrofitted to the earlier SH-3Gs still in service.

The SH-3H has provisions to carry up to four Mark 46 aerial torpedoes or a combination of torpedoes and mines on its four external weapons stations. Like the earlier versions, the SH-3H is capable of carrying the B-57 or B-61 nuclear weapons. For self-protection, up to two M-60 machine guns can be mounted to the load floor area, and the crew can be armed with versions of the M-16 rifle.

The new SH-3H joined the fleet with Helicopter Antisubmarine Squadron Seven (HS-7) Shamrocks aboard USS SARATOGA (CV-60) during 1973. As the SH-3H became available in greater numbers all of the ASW squadrons on the East and West coasts were eventually re-equipped with the greatly improved SH-3H. NAS Jacksonville, Florida became the home of Helicopter Antisubmarine Wing One for the East Coast ASW squadrons and NAS North Island, California the home of Helicopter Antisubmarine Warfare Wing for the Pacific coast. HS-1 Seahorses were named as the Fleet Readiness Squadron (RAG) for the East coast and HS-10 Taskmasters serves as the Pacific RAG.

On 7 August 1990, the Iraqi armed forces under the command of Saddam Hussein invaded their tiny oil-rich neighbor, Kuwait. The allied coalition forces immediately began the build-up of forces needed to throw out Saddam Hussein. Those forces, operating with the code



**This newly converted SH-3H (BuNo 149927, ex-SH-3A) is equipped with a Canadian-Marconi radar under the fuselage, an under sponson fuel tank and a MK 48 torpedo under the port sponson. The object on the rear fuselage station is a chaff/flare dispenser. (Navy via Jim Presley)**

**A late SH-3H (BuNo 148983) without the underfuselage radar antenna. Sonabouy launchers and a sonabouy data link antenna are under the rear fuselage just below the weapons racks. The MAD towed body is visible on the opposite sponson. (United Technologies via Ron Williamson)**







An early SH-3H (BuNo 151551) of HS-1 Seahorses flies over the beach near NAS Jacksonville, Florida. HS-1 is the Atlantic Fleet training squadron for the SH-3. This SH-3H carries the surface search radar under the fuselage. (Navy via Ron Williamson)

name of Operation DESERT SHIELD included the U.S. aircraft carriers USS INDEPENDENCE (CV-62) with HS-8 Eight Ballers and USS DWIGHT D. EISENHOWER (CVN-69) with HS-5 Night Dippers aboard. Both carriers stayed on their assigned stations until they were rotated back to the United States and replaced by six U.S. aircraft carriers for the assault on Kuwait and Iraq. The U.S. carriers that participated in DESERT SHIELD/STORM per-

A SH-3H of HS-2 Golden Falcons drops a practice Mk 44 anti-submarine torpedo. HS-2 is the only helicopter anti-submarine squadron to carry the American Flag on the fuselage. (Navy)

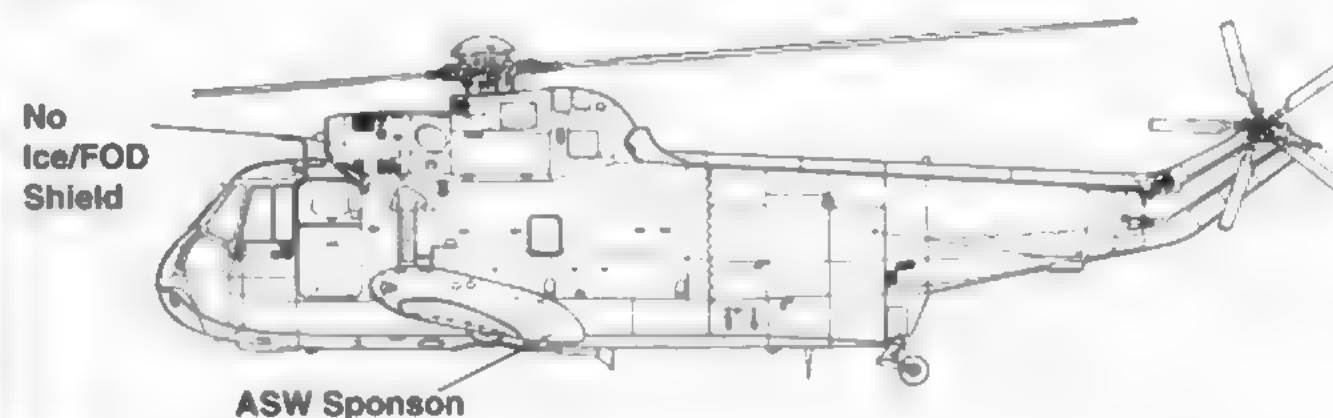


A Sea King of HS-3 Tridents deploys its AQS-13 dipping sonar. The aircraft was assigned to USS FORRESTAL (CV-59) and was a SH-3A that was converted to SH-3H standards. The squadron recently re-equipped with the SH-60F Seahawk. (Navy via Ron Williamson)

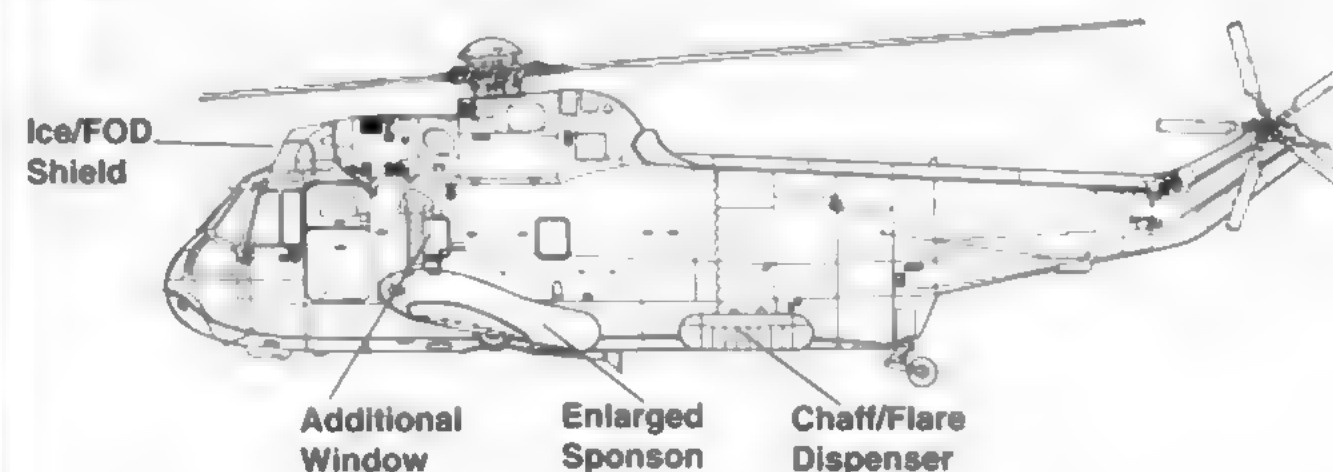
formed ship control and anti-mine warfare. Anti-mine warfare was carried out by all Helicopter Antisubmarine Squadrons (HS), but the most successful was HS-9 Sea Griffins flying off USS THEODORE ROOSEVELT (CVN-71). Lieutenant Commander J.C. "Jim" Cox

## Fuselage Development

### SH-3D



### SH-3H





A SH-3H of HS-4 Black Knights flies over the Golden Gate Bridge out ahead of USS CARL VINSON during the ship's return to Alameda, California. The unit transitioned to the SH-60 during 1991. (Navy)

This SH-3H of HS-5 Night Dippers is lowering its dipping sonar to begin a sweep for submarines in the Mediterranean Sea during 1988. At the time the aircraft was flying from USS DWIGHT D. EISENHOWER. (CVN-69) (Navy)



A SH-3H (BuNo 152131) of HS-3 lands aboard USS SARATOGA (CV-60) during the ship's Med cruise of 1966. The aircraft carries an M-60 machine gun mount in the open doorway, although no gun is fitted. AA 616 carries an "E" ribbon award on the fuselage under the pilots window. (HS-3, Navy)

of HS-9 explained how the anti-mine operations worked in the Persian Gulf area, *"Our helicopters were stripped of all ASW gear, since no perceived submarine threat existed, this lightened the aircraft and gave us a longer loiter time to locate the floating mines."*

LCDR Cox continued by saying that their SH-3H was fitted with two M-60 machine guns on pedestal mounts and they carried sharpshooters armed with M-16's. *"Once the mines were located we would hover near the mine and members of a SEAL team would jump into the water and attach an explosive device to the mine. We would then extract the team from the water and fly a safe distance from the mine and detonate it electronically. Our flight team was able to successfully destroy four mines while we were in the Persian Gulf."*

The SH-3H is flown by other than ASW squadrons, Helicopter Combat Support Squadron Two (HC-2) Circuit Riders has a SH-3H that is used by the Commander of Strike Fleet Atlantic. The SH-3H (BuNo 148048) is flown by Detachment Two aboard USS MOUNT WHITNEY (LCC-20). Keeping with HC-2's Duck tradition, the aircraft is named Polar Duck to commemorate the 1991 deployment above the Arctic circle. In 1992, HC-16 Bullfrogs began trading in their SH-3Ds for the SH-3H. The newer SH-3Hs, with all external ASW equipment removed and just the bare consoles on the interior began service in the SAR and utility roles operating out of NAS Pensacola, Florida. HC-16 also provided plane guard and a shore-to-ship transport of essential cargo to the training carrier USS FORRESTAL (CV-59).

The SH-3H is also used by NAS Jacksonville in the SAR role. They have four SH-3Hs dedicated to Search and Rescue and they are painted an overall Dark Gull Gray with Yellow fuselage recognition stripes. At NAS Fallon, Nevada, the U.S. Navy Strike Warfare Center operates a SH-3H (BuNo 148971) called Strike 70, to train pilots in strike Search and Rescue. NAS Fallon aircraft are painted in an overall Medium Gull Gray and feature a lightning bolt



through the modex identification number.

During 1985, HS-6 Indians sent a one aircraft detachment aboard the destroyer USS KINCAID (DD-965) for a one month test of the new sonar data computer. The new computer demonstrated the usefulness of the passive processing capability of the sonobuoys in conduction with the computer. The test also proved the usefulness of a ASW helicopter being based aboard the small decks of frigates and destroyers. The first basing of a Sea King on a destroyer was in 1966 when HS-2 served in the SAR role in the Tonkin Gulf off North Vietnam aboard USS MAHAN (DLG-17).

## USH-3H

In 1987, the U.S. Navy began replacing the SH-3G and SH-3H with various navalized versions of the Sikorsky H-60 Seahawk, the Seahawk offered improved performance in the ASW role and the ability to operate off of smaller shipboard helipads. One big drawback of the Seahawk lies in cabin volume, the H-60 has 385 cubic feet of cabin volume while the SH-3H has a volume of 1,050 cubic feet. The Seahawk, although of a newer design, does not offer the speed, range or load carrying capability of the older Sea King.

During 1992, the U.S. Navy began the conversion of a number of SH-3H aircraft by removing all ASW equipment and strengthening and reinforcing the load floor area. The revised SH-3H was redesignated USH-3H, to show its true utility role. HC-2, out of NAS Norfolk began operating their USH-3Hs in late 1992, in support of Atlantic fleet operations.

**A SH-3H (BuNo 149738) of HS-5 flies along side a U.S. Nuclear Ballistic Missile Submarine (SSBN) in the Atlantic. The aircraft is carrying a practice Mk 48 torpedo on the starboard forward weapons station indicating that a ASW exercise is about to get underway. (Navy via Ron Williamson)**



**This SH-3H (BuNo 152124) of HS-6 Indians is towing its AN/AQS-81 MAD towed body. The Sea King is over a Navy Frigate in the Pacific. Smoke markers are carried under the sponson for target marking. (Navy)**





A Sea King of HS-5 rests on the helo deck of the USS TICONDEROGA (CG-47) on 11 March 1990. The unit later re-deployed aboard USS DWIGHT D. EISENHOWER (CVN-69) for duty with the Sixth Fleet in the Med. (David G. Campbell)

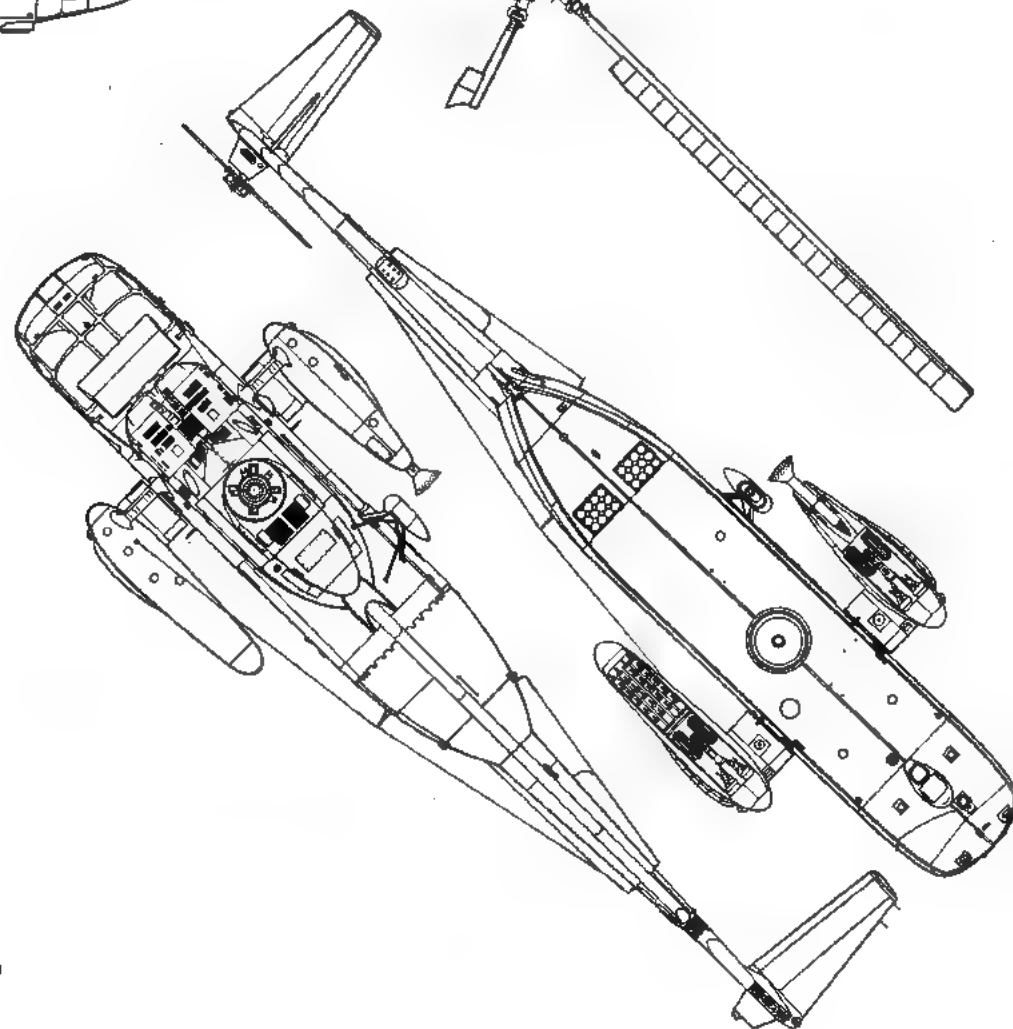
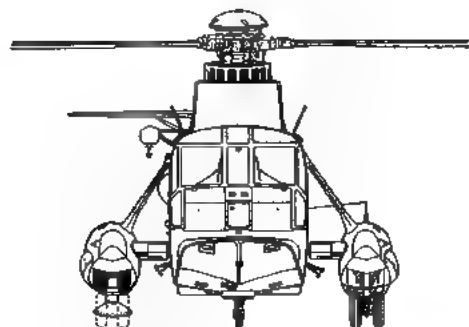
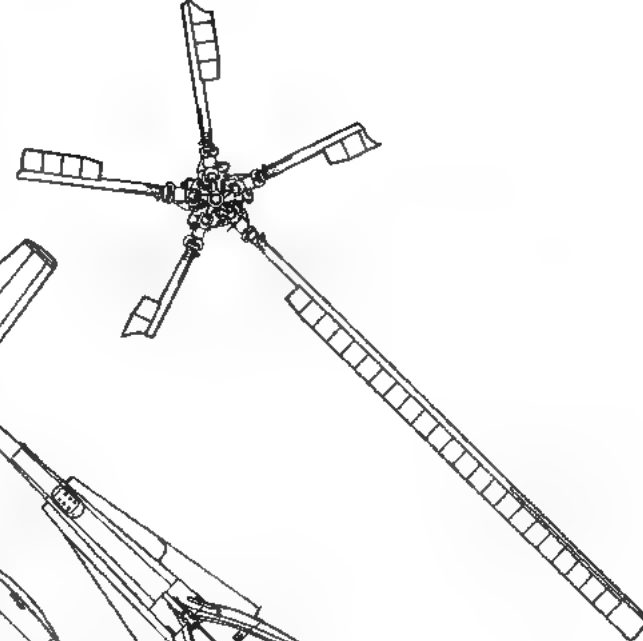
A crewman directs a SH-3H of HS-8 Eight Ballers to a landing aboard USS CONSTELLATION (CV-64) during refresher training off San Diego. The Ice/FOD shield carries the unit insignia. (Navy)



A SH-3 of HS-7 Big Dippers undergoes electronic maintenance on the ramp at NAS Jacksonville, Florida during 1991. HS-7 was assigned to USS JOHN F. KENNEDY (CV-67) and had just returned from duty in the Persian Gulf. (Author)

This SH-3H is carrying a torpedo on the sponson weapons station as it taxis on the ramp of NAS North Island, California during 1990. HS-8 would soon deploy aboard USS INDEPENDENCE (CV-62) for duty in Operation DESERT SHIELD. (HS-8, Navy)



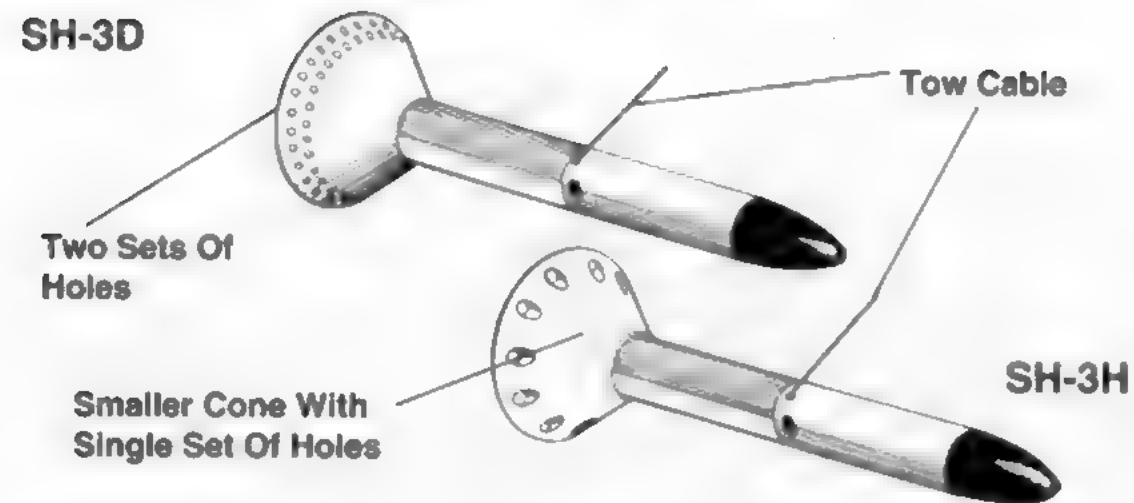


### Sikorsky SH-3H

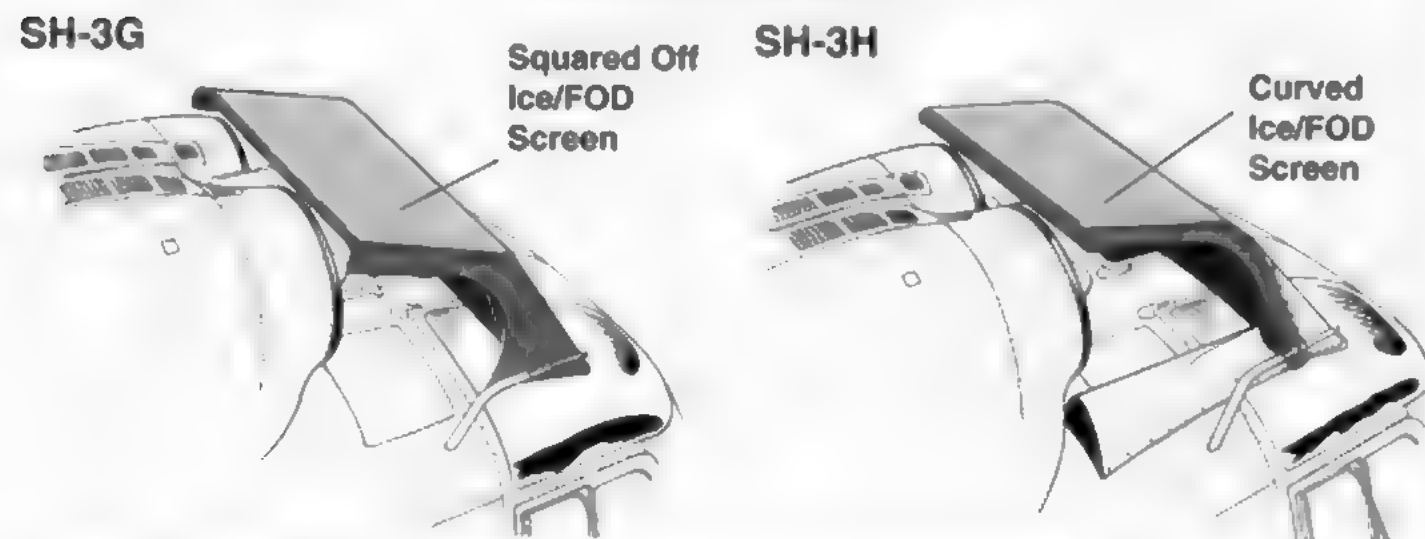
<b>Rotor Diameter.....</b>	<b>62 feet (18.8 m)</b>
<b>Length.....</b>	<b>7 feet 9 inches (22.09 m)</b>
<b>Height.....</b>	<b>16 feet 8 inches (5.03 m)</b>
<b>Empty Weight.....</b>	<b>12,350 pounds (5,601.9 kg)</b>
<b>Maximum Weight.....</b>	<b>21,000 pounds (9,525.6 kg)</b>

<b>Powerplant.....</b>	Two 1,500 shp General Electric T58-GE-10 shaft turbine engines.
<b>Armament.....</b>	Up to four ASW torpedoes and two M60 machine guns.
<b>Speed.....</b>	166 mph (267.1 kph)
<b>Service Ceiling.....</b>	15,000 feet (4,572 m)
<b>Range.....</b>	625 miles (1,005.8 km)
<b>Crew.....</b>	Four

## MAD Gear



## Ice/FOD Screen



A SH-3H turns up on the deck of USS INDEPENDENCE (CV-62) in the Indian Ocean during the ship's 1990 deployment. The maintenance crew will remove the wheel chocks once the aircraft was cleared to lift. (Navy)



A SH-3H of HS 9 Sea Griffins flies low over the Bermuda operating area during 1986. The aircraft carries a chaff/flare dispenser on the port rear weapons station. (Navy)

This SH-3H was once an Air Force CH-3B before being converted to SH-3H standards. The aircraft is assigned to HS-10 Taskmasters, the Pacific training squadron based at NAS North Island, San Diego, California. Two ex-USAF CH-3Bs were converted to SH-3H standards. (Navy)







A SH-3H (BuNo 151541) of HS-9 undergoes servicing by its maintenance crew. The aircraft served in Operation DESERT SHIELD/STORM aboard the USS THEODORE ROOSEVELT (CVN-71). At the time the aircraft was flown by LCDR J.C. Cox who destroyed four Iraqi mines in the Persian Gulf. (Author)

This SH-3 carries two unit awards and a Safety "S" on the forward fuselage. The aircraft was assigned to HS-15 Red Lions aboard USS INDEPENDENCE and was a veteran of the Granada invasion and operations off Lebanon. (Navy)



A SH-3H of HS-11 Dragon Slayers flies out from the USS THEODORE ROOSEVELT (CVN-71) during 1987. This Sea King was a former SH-3D that was converted to SH-3H standards. HS-11 was the first ASW helicopter squadron to deploy aboard the "Teddy" ROOSEVELT. (Navy)

This overall Medium Gray SH-3H of HS-75 is undergoing maintenance and corrosion prevention after returning from Diego Garcia. HS-75 is a Pacific coast reserve squadron that served at Diego Garcia in the Indian Ocean during the Gulf War. (Author)





The Emerald Knights of HS-75, a Pacific coast reserve squadron, served in Operation DESERT STORM and were responsible for the recovery of a B-52 crew that crashed in the Indian Ocean after a mission over Iraq. At the time the unit was stationed on the Island of Diego Garcia. (Author)

This SH-3H is assigned to the Commander Second Fleet aboard USS MOUNT WHITNEY (LCC-20). The aircraft is secured by chains to the metal tie-downs in the ship's deck to prevent it from rolling about in heavy seas. (Stu Jones)



This SH-3H, on the ramp at NAS Fallon, Nevada is assigned to the Naval Strike Warfare Center as a Search and Rescue (SAR) aircraft. Strike 70 is used to train pilots in proper combat search and rescue techniques. (Terry Love)

A SH-3H of HC-2 Detachment Two rests on the deck of USS MOUNT WHITNEY (LCC-20). The aircraft is named *Polar Duck* in keeping with the squadron tradition of naming their aircraft "something" Duck and for the unit's participation in an Arctic operation. (Stu Jones)





A SH-3H of HC-2 Detachment 4 tied down on the deck of USS MOUNT WHITNEY. The rotors are folded back and tied down to keep them from flapping in the wind. (Stu Jones)



A SH-3H of the Naval Air Test Center, NAS Patuxent River, Maryland parked on the helo pad of USS IOWA (BB-61). The aircraft was White over Gray with a Red nose and tail. (Navy)

A SH-3H (BuNo 149906) from NAS Jacksonville, Florida is serviced prior to a flight in September of 1991. NAS Jacksonville operates five SH-3H aircraft in the SAR role over the west Atlantic. The aircraft is overall Medium Gray with Yellow stripes. (Author)



This SH-3H is assigned to Air Test And Evaluation Squadron One (VX-1) at NAS Patuxent River, Maryland. VX-1 tests and evaluates all new equipment destined for rotor craft before the item is cleared for fleet use. (Terry Love)





# Test and Civilian

Sikorsky manufactured two different models for the civilian market, the S-61L and S-61N, both very similar to the military S/CH-3A/B except for a longer fuselage.

The S-61L is the non-amphibian model and it incorporates a conventional non-retractable main landing gear configuration for land use. Other features common to the S-61L are a controllable horizontal stabilizer and non-folding rotor blades, as in the S-61R model. The S-61L was originally powered by a pair of General Electric CT58-GE-110-1 shaft turbine engines. These were later replaced by 1,500 shp CT58-140 engines. With the new engines installed the aircraft is designated as the S-61L Mark II. The S-61L has a top speed of 150 mph and a normal cruising speed of 140 mph. Fuselage length is 58 feet 11 inches compared to 54 feet 9 inches on the military version. The additional length is a plug just forward of the engine intakes. The S-61L operates with a normal crew of a pilot, copilot and one flight attendant. Up to twenty-eight passengers can be accommodated or up to 8,000 pounds of internal cargo can be carried when it is configured as a cargo/freighter.

The first flight of the prototype S-61L was made on 6 December 1960 and it received a FAA type approval on 2 November 1961. Two S-61Ls were assembled in Japan by Mitsubishi for The first prototype S-72, a joint NASA/Army aircraft, makes a test flight at NASA's Ames-Dryden Flight Research Facility located at Edwards AFB, California. The flight systems from a S-61 were used in the S-72. (NASA)

Nitto Airways. Pan American and Los Angeles Airways each operated three S-61Ls.

Carson Helicopters of Perkasi, Pennsylvania modified one of their S-61L helicopters by shortening the fuselage by 50 inches making it the same length as the CH/SH3A military model. Carson also upgraded the external sling capability to 11,000 pounds over the previous 10,000 pounds.

On 6 October 1964, the S-61L and S-61N became the first transport helicopters to receive FAA approval for instrument flight operations, greatly expanding flight operations in adverse weather.

By far the most popular of the two civilian models was the S-61N, which was similar to the S-61L, but with a sealed fuselage for amphibious operations. The S-61N also was equipped with large stabilizing floats mounted on the landing gear supports. The sponsons also acted as fairings for the retractable main undercarriage. The first flight of the S-61N occurred on 7 August 1962. The S-61N has a empty weight of 12,256 pounds and a maximum takeoff weight of 19,000 pounds. As in the S-61L, a normal crew of three is carried. Passenger capacity is restricted to twenty-six due to increased weight of the associated landing gear and sponsons.

Over thirty airlines around the world still operate the S-61L and S-61N in regular passenger

**The second prototype S-72, Rotor Systems Research Aircraft was fitted with wings and turbojets to explore the dynamics of compound helicopter operations. The aircraft could be flown as a fixed wing aircraft or as a helicopter, or both. (NASA)**







The S-67 Blackhawk was Sikorsky funded project aimed at developing a gunship for the war in Southeast Asia. The Blackhawk used the flight components of the S-61R (HH-3E) and could carry up to fifteen troops as well as the two man flight crew. (via Paul Novak)

service, Agusta of Italy produced the aircraft under license as the AS-61N1 that featured the shortened fuselage of the CH/SH-3A military model.

On 9 June 1980, Sikorsky delivered its 136th and last S-61 commercial model helicopter after a production run that lasted for 20 years.

Sikorsky used various S-61 models and flight dynamic components of the S-61 model on three different models that were used for research and for possible military application.

## S-67 Black Hawk

A single S-67 Black Hawk was produced as a private venture by Sikorsky to meet the need for a high speed helicopter gunship that could survive in the harsh Southeast Asia operating area. The S-67 could also accommodate up to fifteen troops in the fuselage, similar to the Soviet Mi-24 Hind. The engine, transmission and rotor system of the S-67 was taken from the S-61R (HH-3E) and modified for use on the prototype.

## S-72 RSRA

As a follow-on to the Sikorsky S-61F (NH-3A) compound helicopter project for the U.S. Army and U.S. Navy, two S-72 Rotor System Research Aircraft (RSRA) were produced by Sikorsky, also using the dynamic flight components from the S-61R. The RSRA aircraft was a joint NASA/U.S. Army project to explore the flight characteristics of the compound pow-



Carson Helicopters of Perkaskie, Pennsylvania modified one of their S-61L models by shortening the forward fuselage by thirty inches and increasing the sling load capacity to 11,000 pounds. Carson paints their helicopters Yellow with a White fuselage band. (Carson Helicopters)

ered helicopter. The S-72 could be flown as a fixed wing aircraft using the fuselage mounted General Electric TF34-GE-400A turbofan engines for power, or the rotor system could be engaged to take off and land like a true helicopter, then go to the turbojets for forward flight. A number of flight regimes were tested during the ten year span of tests and much valuable test data was derived for possible future civilian and military helicopter designs.

## S-61A Quiet Helicopter

Under a U.S. Army Advanced Research Project Agency (ARPA) program, Sikorsky was issued a \$375,000 contract to modify a S-61A (SH-3A) by doubling the number of main rotor blades to ten and adding one blade to the tail rotor. This effectively slowed the speed of the rotors and made the helicopter quieter. The slower operating blade speed also slowed down the top speed of the helicopter, but increased lift capacity. No production contracts were forthcoming and the project was canceled.



The most popular civilian model is the S-61N. The S-61N was amphibious and could carry up to twenty-five passengers or up to 7,000 pounds of cargo internally. Ansett-Ana was one of the first customers for the S-61N. (Sikorsky)

The Canadian Coast Guard uses the S-61N in the Search and Rescue (SAR) and utility roles on the Pacific coast. The aircraft is overall Red with a White fuselage stripe. It carries an air data probe on the rotor head. (Canadian Coast Guard via Rod Nelson)



A S-61N of Evergreen Helicopters lands on the Sedco-706 oil rig to deliver workmen and supplies. The S-61N is fully amphibious and could haul an impressive load over a long distance. (Sikorsky)



The 71st Special Operations Squadron (71st SOS) flew this HH-3E out of King Fahd Airport, Dammam, Saudi Arabia in the search and rescue role during Operation DESERT STORM.



This HH-3F Pelican operated from United States Coast Guard Air Station Clearwater, Florida for search and rescue operations.



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